

APPENDIX L

Estimated Costs for Proposed Amendments and Alternatives

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–Appendix L–
Estimated Costs for Proposed Amendments and Alternatives

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The purpose of this appendix is to describe the methodology, data, and assumptions used to estimate costs and cost-savings presented in the economic impacts assessment (Chapter VIII) and in the regulatory alternatives evaluation (Chapter IX). Sections A through H describe estimates specific to each proposed amendment and its alternatives. Section I provides tables that summarize costs and cost-savings organized by sector, amendment, and alternative. These tables typically use rounded numbers. Section J provides a comparison of the proposed amendments to Alternatives 1 and 2. Section K describes the methods used to estimate the number of businesses affected by sector. References cited in this appendix are included in the Chapter XII References list. Costs and cost-savings are analyzed beginning 2021 through 2030. As described in Chapter VIII (section B), this 10-year lifetime was selected to encompass potential impacts of the proposed amendments through the likely timeframe of amendments to the regulation.

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A. REPLACE ISD OVERPRESSURE ALARMS WITH INFORMATIONAL PRESSURE REPORT

CARB staff evaluated potential costs and cost-savings under the proposed amendments and four alternatives for changes to ISD software requirements to eliminate ISD overpressure alarms. All costs and cost-savings associated with the proposed amendments and alternatives are estimated as though Advisory 405 were not in place because Advisory 405 is not a regulation. The economic effects of Advisory 405—such as cost relief for GDF owners and reduced revenue for service contractors—are not considered as part of baseline cost estimates (Alternative 1) for comparison to costs and cost-savings associated with the proposed amendments and Alternatives 2 through 4.

Proposed Amendments

More than 5,000 GDFs experience ISD overpressure alarms that can cause response costs for GDF owners without reducing air pollutant emissions. At the same time, there is an ongoing need for improved underground storage tanks (UST) ullage pressure data storage and reporting. To address these problems, the proposed amendments would replace the requirements in Section 9 of CP-201 for overpressure alarms in ISD software with requirements for improved informational reports and UST ullage pressure data storage to make stored information more useful.

The proposed amendments would require the two ISD manufacturers to eliminate the overpressure alarm criteria in their ISD software, add improved informational reports, and require additional UST ullage pressure data storage the next time they seek CARB certification renewal. The improved informational reports would contain UST ullage pressure data summaries. (See Chapter II and III for more information about the proposed pressure summaries.) Compliance with the proposed amendments would not require any changes to the ISD housing console, vapor flow meters, or UST pressure sensors.

The proposed amendments would require owners and operators of existing GDFs that have major modifications or ISD consoles damaged beyond repair to install the updated ISD software, and owners and operators of new GDFs to install ISD systems with the updated ISD software at the time of construction, after CARB certifies the updated ISD software (anticipated by December 2022). The proposed amendments would allow GDF owners and operators of existing GDFs that do not require major modifications to install the updated ISD software on a voluntary basis.

Direct and indirect costs and cost-savings under the proposed amendments could result from several types of required and voluntary actions by multiple business sectors and government agencies that would not occur under business as usual (BAU, economic baseline under the current regulation):

- Certification of updated ISD software:
 - ISD manufacturers required to make changes to their software the next time they seek certification renewal; and

- CARB and other state and local agencies that participate in the certification process.
- Installation of updated ISD software:
 - Business- and government-owned GDFs with ISD that are required to or voluntarily install updated ISD software;
 - Local agencies that issue permits to GDF owners for updated ISD software installation;
 - Service contractors hired by GDF owners that install updated ISD software; and
 - Service contractors hired by GDF owners to respond to ISD overpressure alarms.

CARB staff evaluated potential direct and indirect costs and cost-savings that could result from voluntary as well as required actions under the proposed amendments. Many owners of existing GDF would have the option choose to continue to respond to ISD OP alarms rather than update their ISD software. Consequently, it is not possible to know how many existing GDFs may install updated ISD software; from zero to 100 percent of existing GDFs may install updated ISD software. As described later in this section, CARB staff used available information about the statewide distribution of ISD overpressure alarm frequencies, alarm response costs, and ISD software installation costs to estimate the likely maximum number of business-owned GDFs that may voluntarily install updated ISD software as a means to reduce operating costs. These estimates, combined with estimates of the number of business-owned GDFs that could be required to install updated ISD software, enable CARB staff to estimate a potential range of direct costs and cost-savings for business-owned GDFs and associated fiscal impacts for permitting agencies and indirect revenue impacts for service contractors.

Several of the estimates described in the following sections make use of the estimated distribution and number of California GDFs with ISD systems presented in Tables L-1 through L-3. Based on February 2020 Air District survey results [CARB, 2020a and 2020k], California has about 7,820 business-owned GDFs with ISD systems, of which all except two are retail GDFs, and about 10 government-owned GDFs. CARB staff assumes that businesses that own 11 or fewer GDFs are likely to be small business because U.S. Census Bureau statistics indicate retail gas stations in California have on average nine employees [USCB, 2020a]. Based on a review of CERS database UST ownership records [CERS, 2018; CARB, 2020o], CARB staff estimates about 62 percent of these GDFs are owned by small businesses that own 1 to 11 GDFs, and about 70 percent of small business-owned GDFs are owned by single-store businesses. See section J for more information about methods used to estimate the number of GDFs by business type.

Table L-1: Estimated percentages of existing GDFs with ISD systems that have assist and balance vapor recovery systems

Description	Assist	Balance
Percent of GDFs with ISD that have assist and balance Phase II EVR systems ^[a]	45%	55%

[a] Air Districts reported in a February 2020 survey that about 45% of retail GDFs have assist systems and 55% have balance systems [CARB, 2020a]. The survey did not report the type of system for GDFs owned by non-retail businesses and government agencies. For these cost estimates, CARB staff assumes non-retail business-owned and government-owned GDFs have the same distribution.

Table L-2: Estimated number of existing GDFs with ISD systems in California

DESCRIPTION ^[a]	# of GDFs with Assist	# of GDFs with Balance	Total # of GDFs	% of All GDFs
Estimated # of existing GDFs with USTs and ISD systems	3,572	4,258	7,830	100%
# of GDFs owned by businesses	3,567	4,253	7,820	99.87%
# of retail GDFs	3,566	4,252	7,818	99.85%
# of retail GDFs owned by hypermarkets ^[b]	217	158	375	4.79%
# of retail GDFs owned by large/mid-sized businesses	1,168	1,428	2,596	33.15%
# of retail GDFs owned by small businesses	2,181	2,666	4,847	61.90%
# of nonretail GDFs	1	1	2	0.03%
# of GDFs owned by government entities	5	5	10	0.13%
# of GDFs owned by federal agencies	3	3	6	0.08%
# of GDFs owned by state agencies ^[a]	0	0	0	---
# of GDFs owned by local agencies	2	2	4	0.05%
# of GDFs owned by private entities	0	0	0	---

[a] CARB staff estimated the statewide number of GDFs with ISD by sector based on February 2020 Air District survey results and a review of CERS database UST ownership records [CARB, 2020a, 2020k, and 2020o]. The recent Air District survey [CARB, 2020a] indicates no state agencies own or operate any GDFs with ISD.

[b] Retail GDFs that typically dispense $\geq 600,000$ gallons/month are called 'hypermarkets' (HM) in this assessment. Hypermarkets are typically owned by big-box grocery stores and mass merchandising stores such as Costco, Sam's Club, Walmart, and Safeway/Vons. A recent survey of Air District permitting programs [CARB, 202a] and information provided by GDF owners indicate more hypermarkets have assist vapor recovery systems than balance systems, which is different from the overall distribution reported in Table L-1.

Table L-3: Number of new retail GDFs with ISD predicted to be constructed between 2021 and 2030 throughout California

DESCRIPTION	ASSIST GDFs			BALANCE GDFs			TOTAL
	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	
# of new retail GDFs predicted to be constructed over next 10 years ^[a]	199	20	107	244	14	131	715

[a] Staff of Air Districts that encompass ~85% of statewide retail GDFs reported in a February 2020 survey that they estimate ~608 new retail GDFs with ISD will be built during the next 10 years [CARB, 2020a]. CARB staff used this equation to adjust the statewide estimate for non-reporting Districts: $= 608/0.85 = 715$. CARB staff assumes all new GDFs with ISD will be owned by retail businesses because retail businesses currently own more than 99.8% of GDFs statewide. CARB staff assumed new GDFs would have the same size and vapor recovery equipment distribution as existing GDFs.

Direct costs and cost-savings under proposed amendments

The itemized list below describes potential direct costs under the proposed amendments for changes to ISD software requirements intended to eliminate ISD overpressure alarms.

Businesses active in California:

ISD Manufacturers: ISD software development, certification testing, and manufacturing costs.

The proposed amendments would require the two current ISD manufacturers, INCON and Veeder-Root, to remove the ISD overpressure alarm criteria from their ISD software, and add the additional pressure report and storage capability, the next time they seek CARB certification. Both ISD manufacturers are headquartered outside of California. No other manufacturers have expressed interest to CARB staff in selling ISD systems in California.

CARB staff assumes all initial and ongoing costs for ISD manufacturers will be passed on to consumers (GDF owners and operators) in the purchase price of the updated ISD software so that there will be no net cost impact to manufacturers.

Based on discussions with ISD manufacturers, CARB staff expects the updated ISD system software to be certified one to two years after the effective date of the amended regulation. CARB staff assumes both manufacturers will redesign software in 2021 (fiscal year [FY] 2021/22), and complete the CARB certification process and multi-agency review process by the end of December 2022 (FY2022/23). For these cost estimates, CARB staff assumes updated ISD software will be available for purchase by California customers in early 2023.

The following estimates for costs for ISD manufacturers are based on CARB staff's review of recent certification invoices, communications with ISD manufacturers and reviewing agencies, and other sources of information and assumptions as noted.

One-time costs

One-time costs include manufacturer time and materials needed to redesign their updated ISD software. One-time costs also include costs for CARB certification staff to test the updated ISD software at working GDFs, reimbursement to GDF owners for down time at the test sites, fees for local Air District research and development (R&D) permits for the test sites, and fees for other state agencies to review and approve the use of the updated ISD software at GDFs throughout California. These agency costs are recovered from the ISD manufacturers.¹

- **\$79,892** – Total one-time costs assumed to occur in 2021.
 - **\$72,720** (\$36,360 per manufacturer) for manufacturer time and materials needed to redesign and test their updated ISD software, submit requests to CARB for research and development (R&D) test sites, and submit R&D permit applications to the local Air Districts.
 - **\$7,172** (\$3,586 per manufacturer) for Air District R&D permit fees for the test sites.
 - Table L-4 describes the estimation assumptions for these costs.
- **\$143,160** – Total one-time costs assumed to occur in 2022.
 - **\$38,400** (\$19,200 per manufacturer) for manufacturer time and materials needed to do the following: submit CARB Vapor Recovery Certification Applications; develop materials necessary for CARB certification documentation; review, and comment on draft CARB Executive Order, Certification Summary, and other draft certification documents; obtain review and approvals by other State agencies, and submit approval documents to CARB to include in the final Executive Order package.
 - **\$40,000** (\$20,000 per manufacturer) to reimburse GDF owners for down time at the test sites.
 - **\$64,110** (\$32,055 per manufacturer) to reimburse CARB for CARB staff time and expenses for certification testing and development of the certification Executive Order and exhibits.

¹ Health and Safety Code § 41954(e) and § 41961 state that CARB, the State Fire Marshal, the Division of Measurement Standards, and the Division of Occupational Safety and Health may charge a reasonable fee for certification of a gasoline vapor control system or a component thereof, not to exceed the actual cost. CARB certification evaluation costs, including any cost increases resulting from amended or new standards and specifications such as those proposed for ISD software, are invoiced to and paid by the manufacturers seeking CARB certification to sell their products in California.

- **\$650** (\$325 per manufacturer) to reimburse review fees for two other State agencies, the Department of Forestry and Fire Protection's Office of the State Fire Marshall (SFM), and the Department of Industrial Relations' Division of Occupational Safety and Health (DOSH).
- Table L-5 describes the estimation methods for these costs.

Annual ongoing costs for 2023 through 2030

CARB staff estimated annual ongoing costs for ISD manufacturers of approximately **\$11,000 to \$690,000 per year** to produce and distribute updated ISD software, depending on the demand for new ISD consoles for new GDF construction and major modifications at existing GDFs, and for GDFs owners that decide to voluntarily install updated ISD software. Tables L-6 through L-8 describe the methods to estimate annual ongoing costs included in the summary tables in section I.

Ongoing costs for manufacturers can include distribution, contractor training, and other costs necessary to make the updated ISD software available to California GDF owners. These costs are expected to be substantially greater for software updates for ISD systems installed at existing GDFs, than for updated software included in new ISD consoles at the time of their manufacture.

Ongoing costs also include the cost of non-volatile memory boards needed to install software updates for Veeder-Root ISD systems at existing GDFs. The current market trading price of flash memory cards typical for electronics such as ISD systems is about \$0.962 per card (DRAMeXchange, 2020). No new hardware (memory board) is needed for existing GDFs with INCON ISD systems that decide to voluntarily install the updated ISD software because service contractors can download updated software from the INCON website to their laptops and then upload the updated software to a GDF's ISD system using a cable or USB memory stick inserted directly into the console USB interface. In addition, no new hardware is needed for new GDFs or existing GDFs undergoing major modifications with either Veeder-Root or INCON systems required to install updated ISD software because the updated software will already be installed in new ISD consoles.

As described later in this appendix in Table L-13, the ISD manufacturers provided CARB staff with estimated costs for GDF owners to purchase updated ISD software for voluntary installations at existing GDFs as well as estimated costs to provide the updated software in new ISD consoles that would be installed at new GDFs and existing GDFs undergoing major modification. CARB staff used these costs to estimate costs to the ISD manufacturers to produce and distribute the updated software on an ongoing basis. Veeder-Root informed CARB staff that they do not currently plan to increase the purchase price of new ISD consoles to include any compliance costs for the updated ISD software under the proposed amendments and did not provide information about their manufacturing costs. As a result, CARB staff used the INCON cost increase to estimate costs for Veeder-Root to manufacture ISD updates for new ISD consoles.

The cost estimates for ISD manufacturers to design, test, seek CARB certification, produce and distribute updated ISD software over the lifetime of the proposed amendments are described in Tables L-4 through L-8 below. The tables also describe the costs estimates for Alternative 2. Alternative 2 would require ISD manufacturers to replace current ISD overpressure alarm criteria with more complex informational reports. Alternative 2 is described on pages L-47 through L-54. Alternative 3, reviewed on pages L-54 through L-58, is not included in the tables below, as it would have the same costs as Alternative 2, but would be applicable to all GDFs. Alternative 4 is not included in these cost tables because it does not pertain to ISD software updates.

Table L-4: Estimation of one-time costs in 2021 for ISD manufacturers to design and test updated ISD software

Description	Proposed Amendments	Alternative 2
Number of ISD manufacturers	2	2
Number of CARB certification tests per manufacturer Certification Application	2	2
Hourly rate assumed for manufacturer engineers ^[a]	\$120	\$120
Total hours per manufacturer assumed by CARB staff:	303	528
Redesign ISD software	20	45
Review CARB vapor recovery certification & application requirements	3	3
Submit request to CARB for research and development (R&D) test site(s) = 20 hours/site x # of sites	40	40
Prepare and submit application for R&D test site permit application to local Air Districts = 20 hours/site x # of sites	40	40
Conduct R&D to provide data in support of CARB Vapor Recovery Certification Application Proposed amendments: = 100 hours/site x # of sites Alternative 2: = 200 hours/site x # of sites	200	400
Cost for staff time for 2 manufacturers: = Total hours x # of manufacturers x Hourly rate	\$72,720	\$126,720
Fees for Air District R&D permits [see description in 'Air Districts' section later in section A]	\$7,172	\$7,172
Total estimated cost for two manufacturers in 2021:	\$79,892	\$133,892

[a] CARB staff estimates an average hourly rate for manufacturing engineers of \$120 based on: mean hourly wage for a mechanical engineer in May 2018 in California was \$51.62 [USBLS, 2019a], and wages for private industry 'manufacturing' as a percent of total compensation in 2019 was 65.7% [USBLS, 2019b]. CARB staff used these equation to estimate hourly rate: = $\$51.62 \div 65.7\% = \$78.57 = \$80$ (rounded to one significant digit); and to account for all overhead costs: = $\$80 + (\$80 \times 50\%) = \$120/\text{hour}$.

Table L-5: Estimation of one-time costs in 2022 for ISD manufacturers to design and test updated ISD software

Description	Proposed Amendments	Alternative 2
Number of ISD manufacturers	2	2
Number of CARB certification tests per manufacturer Certification Application	2	2
Hourly rate assumed for manufacturer engineers (see Table L-4 footnote [a] for explanation)	\$120	\$225
Total hours per manufacturer assumed by CARB staff:	160	225
Prepare and submit certification application to CARB	80	160
Review draft Executive Order, Certification Summary	40	25
Obtain approvals from other State agencies (see 'State Government' subsection later in section A) and submit to CARB to include in final Executive Order package	40	40
Cost for staff time for 2 manufacturers: = Total Hours x # of Manufacturers x Hourly Rate	\$38,400	\$54,000
Reimbursement to GDF test site owner for any down time = Reimbursement rate x # of test sites x # of manufacturers	\$40,000	\$40,000
Reimbursement to CARB for CARB staff time and expenses for certification testing and development of certification documents (see 'State Government' subsection later in section A)	\$64,110	\$72,090
Reimbursement to other State agencies for review time (see 'State Government' subsection later in section A)	\$650	\$650
One-time cost for 2 manufacturers in 2022	\$143,160	\$166,740

Table L-6: Estimation of ISD manufacturer production cost per ISD software update

Description	Proposed Amendments: Software Installed in New ISD Consoles ^[a]	Proposed Amendments: Software Installed in Consoles at Existing GDFs ^[a]	Alternative 2: Software Installed in New ISD Consoles ^[a]	Alternative 2: Software Installed in Consoles at Existing GDFs ^[a]
(a) Estimated additional cost per GDF for updated ISD software per GDF [from Table L-13]	\$160	\$1,410	\$200	\$3,800
(b) ISD manufacturer cost per ISD software update, assuming the price for GDFs includes a 60% mark-up, ^[b] rounded to nearest whole dollar = (a) ÷ 1.6	\$100	\$881	\$125	\$2,375
(c) Number of business- and government-owned GDFs predicted to install updated ISD software [from Tables L-12, L-18, and L-28]	3,104	3,092	3,104	2,465
(d) Total estimated costs for manufacturers = (b) x (c)	\$310,400	\$2,724,052	\$388,000	\$5,854,375
(e) Estimated design and certification testing costs [from Tables L-4 and L-5]	\$223,052	---	\$300,632	---
(f) ISD manufacturer production costs estimated by subtracting the initial design and certification testing costs from the total estimated costs = (d) - (e)	\$87,348	\$2,724,052	\$87,368	\$5,854,375
(g) Estimated manufacturer production and distribution cost per software update (not including initial design and certification costs), rounded to nearest whole dollar = (f) ÷ (c)	\$28	\$881	\$28	\$2,375

[a] The proposed amendments and Alternative 2 require new GDFs and existing GDFs undergoing major modification to install updated ISD software. The updated software would already be installed in new ISD consoles at the time of their purchase. The proposed amendments and Alternative 2 allow owners of all other existing GDFs to voluntarily install the updated ISD software. INCON software updates can be electronically installed via upload from a laptop to the ISD console or using a USB memory stick inserted directly into the console USB interface. The Veeder-Root ISD system is currently hardware-based and therefore would need an authorized service provider to replace the ISD controller adapter card (aka memory card).

[b] CARB staff estimated potential manufacturer mark-up using this equation: = Profit margin ÷ (1 - Profit margin) = 37.5% ÷ (1 - 37.5%) = 60%. The profit margin of 37.5% [Bizminer, 2020c] is based on the 'motor and generator manufacturing' sector (NAICS code 335312); industry financial reports were not available for other sector NAICS codes that may more accurately describe ISD manufacturers and other vapor recovery equipment manufacturers.

Table L-7: Assumed timing of updated ISD software installations at business- and government-owned GDFs under the proposed amendments and Alternative 2

Category	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Proposed Amendments: Required Installations	0	0	391	390	389	387	387	387	387	386	3,104
Proposed Amendments: Voluntary Installations	0	0	773	774	774	771	0	0	0	0	3,092
Alternative 2 Required Installations	0	0	391	390	389	387	387	387	387	386	3,104
Alternative 2: Voluntary Installations	0	0	616	617	617	615	0	0	0	0	2,465

- [a] Proposed amendments: Number of existing and new business-owned GDFs from Table L-12 plus the number of government-owned GDFs from Table L-18 for required and voluntary software installations.
- [b] Alternative 2: Number of existing and new business-owned GDFs from Table L-28 plus the number of government-owned GDFs from Table L-18 for required and voluntary software installations.

Table L-8: Estimation of ongoing annual costs for ISD manufacturers to produce and distribute updated ISD software and total regulatory lifetime costs

Year	Proposed Amendments: Software Installed in New ISD Consoles	Proposed Amendments: Software Installed in Consoles at Existing GDFs	Proposed Amendments: Total Cost per Year	Alternative 2: Software Installed in New ISD Consoles	Alternative 2: Software Installed in Consoles at Existing GDFs	Alternative 2: Total Cost per Year
2021 ^[a]	\$79,892	\$0	\$79,892	\$133,892	\$0	\$133,892
2022 ^[a]	\$143,160	\$0	\$143,160	\$166,740	\$0	\$166,740
2023 ^[b]	\$10,948	\$681,013	\$691,961	\$10,948	\$1,463,000	\$1,473,948
2024	\$10,920	\$681,894	\$692,814	\$10,920	\$1,465,375	\$1,476,295
2025	\$10,892	\$681,894	\$692,786	\$10,892	\$1,465,375	\$1,476,267
2026	\$10,836	\$679,251	\$690,087	\$10,836	\$1,460,625	\$1,471,461
2027	\$10,836	\$0	\$10,836	\$10,836	\$0	\$10,836
2028	\$10,836	\$0	\$10,836	\$10,836	\$0	\$10,836
2029	\$10,836	\$0	\$10,836	\$10,836	\$0	\$10,836
2030	\$10,808	\$0	\$10,808	\$10,808	\$0	\$10,808
TOTAL ^[c]	\$309,964	\$2,724,052	\$3,034,016	\$387,544	\$5,854,375	\$6,241,919

- [a] Costs for 2021 and 2022 are estimated design and testing costs from Tables L-4 and L-5, respectively.
- [b] Costs for 2023 through 2030 are estimated by multiplying the estimated production cost per software update from Table B row (g) by the number of business- and government-owned GDFs predicted to install required and voluntary software updates each year from Tables L-12, L-28, and L-18, as summarized in Table L-7.
- [c] CARB staff assumes all manufacturer costs will be passed on to consumers (GDF owners and operators) in the purchase price of the updated ISD software so that there will be no net cost impact to manufacturers.

Business-owned GDFs: ISD software purchase, permitting, and installation

After CARB certification of the updated ISD software, the new ISD software would be required for all installations at new GDFs at the time of their construction and major modifications at existing GDFs. GDF owners and operators of other existing GDFs would not be required to install the updated software, but could voluntarily choose to install the updated software based on their site-specific assessments of potential cost savings and business priorities. For example, by making the ISD software update voluntary, owners and operators of existing GDFs could choose to not upgrade the ISD software if their GDFs do not experience ISD overpressure alarms or if the upgrade cost exceeds the cost of responding to ISD overpressure alarms.

As noted in Table 3 in the Chapter VIII of the ISOR, there are about 10,600 GDFs throughout California with USTs that have EVR systems. CARB certification procedure CP-201 requires only those GDFs with annual throughput greater than 600,000 gallons to install ISD systems. Per a February 2020 Air District survey, about 7,820 business-owned GDFs have ISD systems, and all except two of these GDFs are owned by retail businesses. Retail GDFs that typically dispense $\geq 600,000$ gallons/month are called 'hypermarkets' (HM) in this assessment. Hypermarkets are typically owned by big-box grocery stores and mass merchandising stores such as Costco, Sam's Club, Walmart, and Safeway/Vons. The California Energy Commission estimated that in 2018 such GDFs dispense approximately 12 percent of gasoline throughput in California. The remaining retail GDFs average 140,000 gallons/month and include GDFs owned by major oil companies and businesses such as G&M Oil Company, Au Energy, United Oil, and World Oil ('large and mid-sized businesses', L/M), which each own tens to hundreds of GDFs, as well as GDFs owned by small businesses, many of which are single-store owners. About half of GDFs with ISD systems have vacuum assist vapor recovery systems and the other half have balance vapor recovery systems [Table L-1]. CARB staff assumes that businesses that own more than 11 GDFs likely do not meet the definition of "California small business"² because Census Bureau statistics indicate gas stations in California have on average nine employees [USCB, 2020a]. CARB staff categorizes GDFs by retail market type, size, and vapor recovery system in the following tables and text. These categories are needed because, as described in the following text, the types of market and vapor recovery system affect the estimates of ISD overpressure alarm frequency and response costs. In addition, the business size affects estimates for costs that can be influenced by purchasing habits that may differ between hypermarkets and large businesses compared to small businesses.

Number of business-owned GDFs that may be affected:

- **5,614 GDFs** – Total number of existing GDFs and new GDFs (constructed between 2021 and 2030) owned by businesses active in California that may be

² For the purpose of undertaking an economic impact assessment, Government Code § 11346.3, subdivision (a)(4)(B), defines a small business as a business that is all of the following: (i) Independently owned and operated; (ii) Not dominant in its field of operation; and (iii) Has fewer than 100 employees.

- required to or voluntarily install updated ISD software under the proposed amendments.
- **3,098 GDFs** – Estimated number of GDFs required to install updated ISD software.
 - **2,526 GDFs** – Estimated number of existing GDFs required to replace ISD software at the time of major modification. CARB staff estimates about 387 GDFs owned by small businesses and about 2,139 GDFs owned by other businesses will replace their ISD consoles between 2023 (after the updated ISD software is available) and 2030. These estimates are based on information about ISD console ages, discussions with ISD manufacturers and small and large business owners about replacement habits (frequency of major modifications as well as console replacement due to irreparable damage and/or normal wear and tear), and the ratio of small business-owned GDFs estimated by CARB staff’s review of UST ownership records downloaded from the California Environmental Reporting System (CERS) in September 2018 [CERS, 2018].
 - **572 GDFs** - Estimated number of new GDFs required to install ISD systems with updated software at the time of construction. CARB staff estimates about 354 GDFs owned by small businesses and about 218 GDFs owned by other businesses will construct new GDFs between 2023 and 2030. These estimates are based on a February 2020 Air District survey of recent construction permit trends, and the ratio of small business-owned GDFs estimated by CARB staff’s review of CERS UST ownership records [CERS, 2018].
 - Table L-9 illustrates the calculations based on the above information and assumptions.
 - This analysis assumes a uniform age distribution of the existing GDFs so that an equal number of existing GDFs would replace ISD software in each year between 2023 and 2030. In addition, this analysis assumes an equal number of new GDFs would be constructed each year. Table L-12 provides the number of GDFs predicted to be required to install updated ISD software each year.
 - **0 to 3,088 GDFs** – Possible range of GDFs that may voluntarily install updated ISD software as a means to reduce operating costs. CARB staff used the upper end of the estimated range in cost calculations to provide conservative cost estimates.
 - **0 to 3,003 GDFs** – Estimated range of existing GDFs that may voluntarily install updated ISD software. CARB staff estimates that as many as 2,439 GDFs owned by small businesses and as many as 564 GDFs owned by other businesses may choose to install updated ISD software based

on their site-specific cost-effectiveness assessments. These estimates are based on the following:

- The assumption that GDF owners who currently spend more on response costs than the cost of purchasing and installing updated ISD software would install the software to eliminate their alarm response costs;
- CARB staff discussions with GDF owners about their purchasing habits and priorities;
- Comparisons of the cost estimates for alarm response and software installation (described in the following paragraphs) to estimate the number of ISD overpressure alarm responses per year before it is cost-effective (break-even) for a GDF to install updated ISD software [Table L-10];
- CARB staff’s statewide surveys of ISD overpressure alarm frequencies, used to estimate the number of GDFs with alarm frequencies above the “break-even threshold” [CARB, 2020b and 2020n]; and
- The ratio of small business-owned GDFs estimated by CARB staff’s review of UST ownership records downloaded from the CERS database in September 2018 [CERS, 2018; CARB, 2020o].

CARB staff discussions with owners/operators of GDFs owned by small businesses and hypermarkets indicate there may be different timeframes for cost-effectiveness evaluations, with smaller businesses having greater focus on short-term cost-effectiveness. Therefore, to estimate the potential total number of GDFs that might voluntarily install updated ISD software and associated costs, CARB staff assumes the following:

- Hypermarkets and retail GDFs owned by large and mid-sized businesses that would spend more on annual ISD overpressure alarm response costs than the annualized cost of purchasing and installing updated ISD software averaged over 15 years (average useful life of ISD systems) would install updated software to eliminate their overpressure alarm response costs; and
 - Retail GDFs owned by small businesses that would spend more on annual ISD overpressure alarm response costs than the annualized cost of purchasing and installing updated ISD software with costs averaged over 5 years would install updated software to eliminate their overpressure alarm response costs.
- **0 to 85 GDFs** – Estimated number of new GDFs constructed before the updated ISD software is available that may voluntarily install updated ISD software sometime after construction. CARB staff estimates about

48 GDFs owned by small businesses and about 37 GDFs owned by other businesses constructed in 2021 and 2022 will choose to install updated ISD software after it becomes available based on their site-specific cost-effectiveness assessments. These estimates are based on a February 2020 Air District survey of recent construction permit trends, the assumption that future GDFs would have the same alarm frequencies and purchasing habits and priorities as existing GDFs, and the ratio of small business-owned GDFs estimated by CARB staff's review of CERS UST ownership records.

- Table L-11 illustrates the calculations for retail GDFs based on the above information and assumptions.
- A 2020 survey of Air Districts [CARB, 2020a] reported only 2 GDFs with ISD systems in California that are owned by non-retail businesses. Both are used for fleet fueling and neither are rental car agencies. One of the GDFs was reported to be an agricultural facility. The survey respondents did not provide any additional information about the business type of the second GDF, and did not provide the average throughputs or Phase II system type for either of the GDFs. For these cost estimates, staff assumes: both are owned by small businesses; one has an assist system and the other has a balance system; and both have ISD overpressure alarm frequencies greater than the 'break-even threshold' and would voluntarily install updated ISD software under the proposed amendments.
- This analysis assumes existing and new GDFs that choose to install updated ISD software will do so within four years of the software becoming available, by the end of 2026. CARB staff selected a 4-year period because, as noted earlier, CARB staff recommends that CARB and the Air Districts rescind Advisory 405 approximately four years after CARB certification of the upgraded ISD software to allow time for existing GDF owners and operators to assess site-specific alarm trends and evaluate the potential cost-effectiveness of installing the updated ISD software. Table L-12 provides the maximum number of GDFs predicted to voluntarily install updated ISD software each year.

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Table L-9: Estimation of number of business-owned GDFs that may be required to install updated ISD software by December 2030 under both the proposed amendments and Alternative 2

DESCRIPTION	ASSIST GDFs			BALANCE GDFs			TOTAL
	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	
Estimation of number of business-owned GDFs that may be required to install updated ISD systems during major modifications or new construction between 2023 and 2030							
EXISTING GDFs: ^[a]							
# of existing retail GDFs in California [from Table L-2]	2,181	217	1,168	2,666	158	1,428	7,818
% of GDFs assumed to have major modification by December 2030	10%	90%	90%	10%	90%	90%	---
# of existing retail GDFs estimated to be <u>required</u> to install updated ISD software = # of existing retail GDFs x % x 0.8	174	156	841	213	114	1,028	2,526
NEW GDFs constructed between 2023 and 2030:							
# of new retail GDFs predicted to be constructed over next 10 years [from Table L-3] ^[b]	199	20	107	244	14	131	715
# of new retail GDFs predicted to be constructed between 2023 and 2030 and therefore required to install updated ISD software at the time of construction = # of new GDFs x 0.8	159	16	86	195	11	105	572
Estimation of number of business-owned GDFs that may be required to install updated ISD and would experience ISD overpressure alarms in the absence of updated ISD software							
% of GDFs that experienced one or more ISD overpressure alarms during the last 3 years, based on statewide survey ^[c]	95%	100%	95%	57%	100%	57%	---
# of existing GDFs assumed to no longer have overpressure alarms after required installation of updated ISD software:							
# of existing GDFs	165	156	799	121	114	586	1,941
# of new GDFs constructed between 2023 and 2030	151	16	82	111	11	60	431

[a] Under the proposed amendments and Alternative 2, once CARB certifies updated ISD software, owners of existing GDFs would be required to install consoles with the updated ISD software if their GDFs undergo

major modifications or they need to replace their ISD consoles due to irreparable damage and/or normal wear and tear. In February 2020, Veeder-Root informed CARB staff that they estimate GDFs replace their ISD console once every 15 years. This estimate is consistent with CARB staff's field experience: staff have observed that GDF owners typically replace their ISD consoles only when something breaks that cannot be repaired. Also, in 2007 Veeder-Root estimated the average age of ISD consoles in 2007 was greater than 8 years (as noted on their certification application). As a result, Veeder-Root informed CARB staff that they estimate approximately 80-90 percent of the Veeder-Root ISD consoles will be replaced in the next 10 years. CARB staff agrees that nearly all hypermarkets, GDFs owned by large businesses, and government-owned GDFs would replace their ISD consoles during the next 10 years, but, based on discussions with small business owners, predicts only about 10 percent of GDFs owned by small businesses would replace ISD consoles during the next 10 years. CARB staff assumes INCON ISD consoles will have the same replacement rate as that predicted for Veeder-Root consoles. Approximately 93 percent of GDFs have Veeder-Root ISD systems and 7 percent have INCON systems (CARB, 2020a). To estimate the number of GDFs that may replace ISD consoles during the next 10 years, CARB staff multiplied the estimated number of existing, small business-owned GDFs by 10 percent, and the number of other GDF types by 90 percent. To adjust for the 8-year period (2023 through 2030) during which CARB staff expects the updated ISD software would be available and therefore GDFs would be required to install replacement ISD consoles that have the updated ISD software, CARB staff multiplied the 10-year estimates by 0.8.

- [b] CARB staff assumed new GDFs would have the same size and vapor recovery equipment distribution as existing GDFs.
- [c] CARB staff estimated ISD overpressure alarm frequencies for the different GDF categories [CARB, 2020n] based on ISD alarm records downloaded for a recent three-year period (November 2015 through October 2018) by a CARB statewide field survey of approximately 300 retail GDFs throughout the state [CARB, 2020b, Appendix III]. CARB staff adjusted the frequencies for assist GDFs to account for recently adopted nozzle dimension requirements and anticipated reductions from installation of the Franklin Fueling Systems' Healy model 900 assist nozzle with "Enhanced ORVR-Vehicle Recognition" spout assembly ("EOR nozzle") and site optimization. A CARB field study found that use of the EOR nozzle and site optimization reduced the ISD overpressure alarm frequency at 80 percent of the study sites, and these sites experienced an average alarm frequency reduction of approximately 46 percent [CARB, 2018b, Table VI-4]. The EOR nozzle complies with the new nozzle dimension requirements adopted by the Board in 201. The nozzle dimension requirements are designed to improve nozzle compatibility with newer motor vehicle fill pipes and reduce air ingestion at the nozzle, which helps to reduce pressure driven emissions caused by evaporation of gasoline within the GDF UST headspace and associated ISD overpressure alarms [CARB, 2018c]. Also, a CARB field study conducted in early 2019 found 45 percent of assist nozzles were already replaced with the EOR version by February/March 2019 [CARB, 2020b]. CARB staff predicts that about 90 percent or more of the previously certified assist nozzles will be replaced with the EOR nozzle by mid-2022, and the rest by mid-2025 [CARB, 2020c]. Note, the CARB surveys did not include any balance hypermarkets [CARB, 2020b, Appendix III; CARB, 2020n]. CARB staff assumed the percentage of balance hypermarkets with 0 alarms per year is the same as assist hypermarkets based on the observation that both balance and assist hypermarkets operate at vacuum beginning soon after opening and throughout the operating day. Gasoline dispensing generates a vacuum in the ullage (headspace) of both systems because the volume of fuel dispensed is greater than the volume of vapor and air returned to the UST by the Phase II system. The ullage pressure only exceeds atmospheric pressure overnight when fuel dispensing is suspended and the nozzles are not in use. The rise in pressure is caused by the evaporation of gasoline into air that is drawn in through the nozzles and the vacuum relief valve during gasoline dispensing activities. Evaporation is suppressed by gasoline vapors from vehicle tanks that are returned to the UST. The amount of vapor available for return is a function of the vehicle fleet, which is not affected by the type of Phase II system (balance or assist) installed at the GDF. Therefore, evaporation rates are minimally affected by the type of Phase II system. CARB staff reviewed the UST pressure and ullage data for two hypermarkets, one with assist and one with balance vapor recovery systems. These data indicate that nearly all positive pressure occurs during the nightly closure. Because the nozzles are not in use during the closure, the type of nozzle does not affect the UST pressure profile.

Table L-10: Estimation of 'break-even' threshold under the proposed amendments for business-owned GDFs assumed to voluntarily install updated ISD software based on cost-effectiveness

Description	Result
Estimated statewide average cost per GDF to install updated ISD software <i>[described on next page]</i> = Permit fees + Software Cost + Installation Cost + loan interest <div style="text-align: right;"> (a) Divided by 5 years:* (b) Divided by 15 years:* </div>	\$3,569.72 \$714 \$238
Estimated cost to GDF owner per ISD overpressure alarm response <i>[described in next bulleted subsection]</i> = GDF owner time + Service contractor response cost	\$780 per response
<p>Estimated 'break even' thresholds:</p> <p>Minimum number of ISD overpressure alarm responses per year to be cost-effective to install updated ISD software if cost-effectiveness is based on:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 80%;"> <p>(a) Break-even threshold assumed for small business-owned GDFs: ^ = \$715/year ISD software cost annualized over 5 years ÷ \$780 per response</p> <p>(b) Break-even threshold assumed for hypermarkets and large business-owned GDFs: ^ = \$238/year ISD software cost annualized over 15 years ÷ \$780 per response</p> </div> <div style="width: 15%; text-align: center;"> <p>1 alarm per year</p> <p>0.4 alarm per year</p> </div> </div>	

* Values rounded to nearest whole dollar.

^ Values rounded up to 1 significant digit; 0.4 alarm per year equates to about 1 alarm every three years.

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Table L-11: Estimation of number of business-owned retail GDFs that may voluntarily install updated ISD software based on cost-effectiveness under the proposed amendments

DESCRIPTION	ASSIST GDFs			BALANCE GDFs			TOTAL
	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	
EXISTING GDFs: ^[a]							
# of existing retail GDFs in California [from Table L-2]	2,181	217	1,168	2,666	158	1,428	7,818
Break-even threshold (ISD overpressure alarms per year) [from Table L-10]	1	0.4	0.4	1	0.4	0.4	---
% of GDFs with OP alarm frequency \geq the break-even threshold during the last 3 years, based on statewide survey [CARB, 2020b, Appendix III; CARB, 2020n]	86%	93%	90%	29%	93%	43%	---
Total # of existing retail GDFs predicted to voluntarily install updated ISD software = % of GDFs with alarm frequency \geq break-even threshold x # of existing retail GDFs	1,877	202	1,051	774	147	614	---
<i># of existing retail GDFs estimated to be required to install updated ISD software [from Table L-9]</i>	174	156	841	213	114	1,028	2,526
<i># of existing retail GDFs estimated to be required to install updated ISD software that have OP alarm frequency \geq the break-even threshold</i> = % of GDFs with alarm frequency \geq break-even threshold x # of existing retail GDFs required to install updated software	150	145	757	62	106	442	---
Total # of existing retail GDFs predicted to voluntarily install updated ISD software adjusted to account for GDFs required to install updated software = Total # of voluntary installations <u>minus</u> # of required installations at GDFs with alarm frequency \geq the break-even threshold	1,727	57	294	712	41	172	3,003
NEW GDFs constructed between 2021 and 2022:							
# of new retail GDFs predicted to be constructed over next 10 years [from Table L-3]	199	20	107	244	14	131	715
# of new retail GDFs predicted to be constructed between 2021 and 2022 = # of new GDFs x 0.2	40	4	21	49	3	26	143
# of new retail GDFs constructed between 2021 and 2022 predicted to <u>voluntarily</u> install updated ISD software = # of new 2021-2022 GDFs x % of GDFs with alarm frequency \geq break-even threshold	34	4	19	14	3	11	85

Table L-12: Assumed timing of updated ISD software installations at business-owned GDFs under the proposed amendments

Category		2023	2024	2025	2026	2027	2028	2029	2030
Estimated number of GDFs <u>required</u> to install updated ISD software:									
Existing GDFs:	Small CA Business	49	49	49	48	48	48	48	48
	Other Businesses ^[a]	268	268	268	267	267	267	267	267
New GDFs:	Small CA Business	45	45	44	44	44	44	44	44
	Other Businesses ^[a]	28	28	27	27	27	27	27	27
Estimated maximum number of GDFs that may <u>voluntarily</u> install updated ISD software:									
Existing GDFs:	Small CA Business	610	610	610	609	0	0	0	0
	Other Businesses ^[a]	141	141	141	141	0	0	0	0
New GDFs:	Small CA Business	12	12	12	12	0	0	0	0
	Other Businesses ^[a]	10	9	9	9	0	0	0	0

[a] Approximately 58 percent of 'other businesses' are based in California.

Estimated costs for business-owned GDFs for updated ISD software:

- CARB staff assumed GDF owners would obtain a five-year loan with five percent interest to pay for all permitting fees, software purchase, and installation costs. To calculate total cost with interest, staff used the following equation:

$$= 5 \text{ years} \times ((\text{COST} \times (5\% \text{ interest rate} \times (1 + 5\% \text{ interest rate})^{5\text{-year loan period}}) \div ((1 + 5\% \text{ interest rate})^{5\text{-year loan period}} - 1)))$$
 Note, values in summary tables in section J were calculated using costs with unrounded loan interest.
- **\$20** (\$23.10 with loan interest) – Additional one-time cost per GDF for updated ISD software estimated for GDFs required to install updated ISD software (new GDFs and existing GDFs with major modifications) compared to BAU.
 - \$23.10 – Statewide average cost difference between current (BAU) ISD software and updated ISD software. Under BAU, GDFs are already required to install the most recently certified version of ISD system software at the time of construction (for new GDFs) and major modifications (for existing GDFs). The current versions of ISD software for new installations cost \$3,667 for Veeder-Root systems and \$1,340 for INCON systems. The ISD manufacturers provided estimated costs for updated software of \$3,667 for Veeder-Root systems (no change from current cost) and \$1,500 for INCON systems (additional cost of \$160) per software purchase. The statewide average additional cost difference is weighted to account that, per CARB staff’s February 2020 survey of Air

- **\$1,582.18** – One-time, statewide average cost per GDF for software installation. Based on CARB’s March 2020 survey of service contractors, installation of updated Veeder-Root ISD software costs about \$1,400 per GDF, and installation of updated INCON software costs about \$970 per GDF. The statewide average cost is weighted to account that, per CARB staff’s February 2020 survey of Air Districts, about 93 percent of GDFs have Veeder-Root ISD systems and about 7 percent have INCON ISD systems: $(0.93 \times \$1,400) + (0.07 \times \$970) = \$1,370$. With loan interest, the total installation cost is \$1,582.18.
- Table L-13 provides more information about these cost estimates.

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Table L-13: One-time average costs per GDF to purchase and install updated ISD software and long-term maintenance costs under the proposed amendments compared to Alternative 2 ^[a]

Description	Proposed Amendments		Alternative 2	
	Veeder-Root	INCON	Veeder-Root	INCON
Costs for required installations at new GDFs and existing GDFs with major modifications				
Updated ISD software ^[b]	\$3,667	\$1,500	\$4,000	\$1,800
Statewide average one-time cost per GDF for updated ISD software ^[c] (compared to \$3,500 under BAU)	\$3,520		\$3,800	
Average cost of P/V valve under proposed amendments and P/V Zero valve under Alternative 2 (compared to \$480 under BAU) ^[e]	\$480		\$1,700	
Total cost per GDF on average	\$4,000		\$5,500	
Cost difference (Alternative 2 costs minus costs under proposed amendments)	\$1,500			
Costs for voluntary installations at existing GDFs				
Statewide average Air District & CUPA permit fees ^[d]	\$311		\$311	
Updated ISD software ^[b]	\$1,486	\$395	\$4,000	\$695
P/V Zero valve ^[e] (compared to \$480 under BAU)	\$480		\$1,700	
Total capital cost per GDF	\$1,486	\$395	\$5,700	\$2,395
Statewide average one-time capital cost per GDF ^[c]	\$1,410		\$5,469	
Updated ISD software installation & functionality testing ^[f]	\$1,400	\$970	\$1,400	\$970
P/V Zero valve installation & functionality testing ^[g]	<i>not applicable</i>		\$930	\$930
Total installation cost per GDF	\$1,400	\$970	\$2,330	\$1,900
Statewide average one-time installation cost per GDF ^[c]	\$1,370		2,300	
Total one-time costs per GDFs	\$3,091		\$8,080	
Cost difference (Alternative 2 costs minus costs under proposed amendments)	\$4,989			
Annual maintenance costs for required and voluntary installations				
Estimated annual average maintenance cost of P/V valve under proposed amendments and P/V Zero valve under Alternative 2 (compared to \$245 under BAU) ^[h]	\$245		\$148	

[a] These are average cost estimates that do not include any loan interest.

[b] ISD manufacturers provided the estimated costs for updated ISD software. Veeder-Root informed CARB staff that they do not currently plan to increase the price of new ISD consoles under the current regulation to include compliance costs for updated ISD software under the proposed amendments. For Alternative 2, Veeder-Root provided a range of \$3,700 to \$4,200. CARB staff used the midpoint of the range, rounded to two significant digits, for these calculations. Incon provided cost estimates of software updates for existing GDFs for the Proposed Regulations (\$395) and Alternative 2 (\$695), and for new GDFs for the Proposed

Regulations (\$1,500). CARB staff assumed the \$300 difference between the update costs for the Proposed Regulations and Alternative 2 for existing facilities would also be included in the cost for updated software for new facilities under Alternative 2 [= \$1,500 + \$300 = \$1,800].

[c] The statewide averages are weighted to account that, per CARB staff's February 2020 survey of Air Districts, about 93 percent of GDFs have Veeder-Root ISD systems and about 7 percent have INCON ISD systems.

[d] **1. Permit fees for updated ISD software installation:**

Of the 11 Air Districts that responded to a CARB 2020 survey and 4 additional Districts that responded to a 2014 survey [CARB, 2020a], only 1 requires a permit for ISD software updates: San Luis Obispo District (\$220). The other 14 Air Districts that responded encompass more than 89% of GDFs statewide and do not require a permit for ISD software updates. CARB staff estimated a statewide average using this equation: = (89% x \$0) + (11% x \$220) = \$24.20 = \$24 [rounded to nearest whole dollar]. Of the 12 CUPAs that responded to a CARB 2020 survey, only 4 require permits for ISD software updates: San Diego County (\$1,501), Ventura County (\$1,137), Bakersfield (fee amount not provided), and Santa Fe Springs (\$800). These 4 CUPAs regulate ~1,010GDFs. The other 8 CUPAs regulate ~3,323 GDFs and include the Counties of Alameda, Los Angeles, Orange, Riverside, Sacramento, San Joaquin, and Solano, and the City of Anaheim. CARB staff estimated a statewide average using this equation: = (75% x \$0) + (25% x (\$1,501 + \$1,137 + \$800) ÷ 3) = \$286.50 = \$287 [rounded to nearest whole dollar].

2. Permit fees for P/V Zero valve installation:

Of the 13 Air Districts that responded with permit information about P/V valve replacement to the 2020 and 2014 surveys, zero require permits for P/V valve replacement. Of the 11 CUPAs that responded to the CARB 2020 survey with permit information about P/V valve replacement, only 1 requires a permit for installation of a P/V Zero vent valve (\$400, Santa Fe Springs, which has 8 GDFs). The 10 CUPA respondents that do not require permits represent most of the counties and cities with largest urban areas in the state: Los Angeles, San Diego, Riverside, Sacramento, San Joaquin, and Ventura Counties, and Bakersfield. For this reason, CARB staff does not include the Santa Fe Springs CUPA permit fee in the statewide average cost estimate.

3. "Cold start" fees:

Installation of ISD software updates for the Veeder-Root system requires a "cold start" of the ISD system, for which many CUPAs require permits and Monitoring System Certification testing. This permit fee estimate does not include cold start permit fees and associated service contractor testing costs because either the permits are not necessary or can be avoided. For this cost evaluation, CARB staff assumes all GDFs are able to avoid additional cold start permit and testing fees because they are in at least one of these categories: (1) the GDF is in a CUPA district that does not require a cold-start permit; (2) the GDF has an ISD system that does not require a cold start after upgrading software; or (3) the GDF owner can schedule the updated software installation to coincide with already-required annual Monitoring System Certification testing in order to avoid additional cold start permits needed when updating the Veeder-Root ISD software. Of the 12 CUPAs that responded to the CARB 2020 survey, and additional 14 CUPAs that responded to the 2014 survey, 16 require permits for a cold start [CARB, 2020]. Cold start permit fees range from \$205 to \$1,501, with one CUPA (Los Angeles County) having a range based on scope of work, e.g., \$783 to maximum of \$2,489 (3 USTs). Of the 26 CUPAs that responded to the 2014 and 2020 survey question, "Is a monitoring system certification required after Cold Start?", 21 responded "Yes". Service contractor Monitoring System Certification testing and submittal fees for a CUPA cold start permit range from about \$900 to \$1,500.

[e] CARB staff's 2013 and 2020 surveys of distributors provided five Husky P/V valve quotes, which ranged from \$349.96 to \$579.94 and averaged \$467.54; one OPW P/V valve quote (\$324.55); and seven Franklin Fueling Systems P/V Zero valve quotes, which ranged from \$946.59 to \$2,245.93 and averaged \$1,686.74. All 2013 quotes were first adjusted for March 2020 inflation before averaging [CARB, 2020m]. CARB Blitz monitoring conducted in 2013, 2015, and 2018 indicates ~4% of P/V valves installed at GDFs with ISD are FFS valves, ~8% are OPW, and the rest are Husky. Because the OPW valve was recently CARB-certified for use in California, relative to the Husky valve, and has a lower price, CARB staff assumes its installation may become as widespread as the Husky valve, though that may take several years. The OPW valve was

certified by CARB in August 2016 and in about two years (December 2018) comprised 8% of the market. CARB staff uses this equation to estimate a long-term statewide average cost for baseline (BAU/Alternative 1) and proposed amendment calculations: $60\% \times \text{Husky } (\$467.54) + 35\% \times \text{OPW } (\$324.55) + 5\% \text{ FFS } (\$1,686.74) = \$478.45 = \480 , rounded to two significant digits. The average FFS P/V Zero valve cost, rounded to two significant digits, is used for the Alternative 2 calculations.

- [f] INCON software updates are installed via upload from a laptop to the ISD console. Veeder-Root software updates are installed by replacing the non-volatile memory board within the TLS-350 ISD console. Per CARB staff discussions with contractors, it typically takes one to two hours to install ISD software updates (less time needed for INCON) if all goes smoothly, but can take up to four hours. Typical actions include time to shut down dispenser operations, complete back-up sensor mapping, upload software (INCON) or replace software module (Veeder-Root), and reload mapping. Typically two authorized service providers (ASPs) are needed on site. If it is necessary to manually back-up mapping, substantially more time is needed on site. CARB staff estimated installation costs based on the sum of time for two ASPs, \$90/hour, 1.5 hours travel time each, multiplied by 2 to account for consumables, laptop fees, and other overhead expenses, and then summed with vehicle mileage reimbursement cost (\$45 per ASP) (see Table L-14 for explanation of hourly rate and travel costs). CARB staff estimated ASP time on site for Veeder-Root ISD software installation as 2 hours for 80% of installations and 4 hours for 20% of installations; and for INCON ISD software installation as 1 hour for 80% of installations and 2 hours for 20% of installations. These estimates are within the estimate range provided by two service contractors, (1) \$287.50 for basic software update, and (2) \$550 for INCON update and \$1,750 for Veeder-Root update. Estimates rounded to two significant digits.
- [g] The four quotes obtained by the CARB 2013 and 2020 surveys had substantial range with one particularly high outlier that likely included equipment and permitting fees in addition to installation costs: \$470, \$610, \$1,700, and \$4,000. CARB staff used the average of the quotes without the outlier, rounded to 2 significant digits. Estimates do not include the installation of the PV-Zero at the bottom of the vent piping; if it is required or desired to be installed at the bottom of the vent piping, the cost will be much higher (approximately \$5000 to 6000 including the cost of the PV-Zero and fire department permit).
- [h] Air District permit conditions require a leak rate and cracking pressure test of the pressure vacuum (P/V) valve using CARB Test Procedure TP-201.1E as part of performance testing at the time of GDF construction and compliance testing every 1 to 3 years thereafter. The South Coast Air District, which encompasses about 40% of retail GDFs, requires P/V valve testing every 3 years, while other large districts (e.g., San Diego and San Joaquin Air Districts) require TP-201.1E testing and/or other maintenance inspections every year. Service contractors have anecdotally informed CARB staff that it is frequently quicker and more cost-effective to replace Husky P/V valves during annual compliance testing than to conduct (sometimes repeated) testing to identify the source of specific problems. Contractor conversations were specific to Husky P/V valves because OPW P/V valves were not yet certified, but CARB assumes the same to be true for OPW P/V valves. Conversely, the FFS P/V Zero valve is stainless steel with no moving parts, it can be tested without removing the unit from the vent stack, and its maintenance simply involves inspecting and, if necessary, replacing its fluid. For these statewide cost estimates, CARB staff assumes GDFs conduct P/V valve maintenance every 2 years, and about a half hour of contractor time (\$90/hour) is needed for maintenance for all P/V valve models. A CARB staff survey of distributors in 2020 indicates P/V Zero gas/E85 fluid cost ranges from \$176 to \$242; CARB staff uses the midpoint of the range, \$209, for these cost estimates. CARB 2013 and 2020 surveys of distributors provided five Husky P/V valve quotes, which ranged from \$349.96 to \$579.94 and averaged \$467.54; and one OPW P/V valve quote (\$324.55). All 2013 quotes were first adjusted for March 2020 inflation before averaging. CARB Blitz monitoring conducted in 2013, 2015, and 2018 indicates ~4% of P/V valves installed at GDFs with ISD are FFS valves, ~8% are OPW, and the rest are Husky. Because the OPW valve is recently CARB-certified for use in California, relative to the Husky valve, and has a lower price, CARB staff assumes its installation may become as widespread as the Husky valve, though that may take several years. As a result, for these cost estimates for the 2021-2030 project period, CARB staff assumes 60% of statewide GDFs install Husky P/V valves, 35% install OPW P/V valves, and 5% install FFS P/V Zero valves under BAU and the proposed amendments. CARB staff uses this equation to estimate average annual statewide maintenance costs per GDF under BAU and the proposed

amendments: = (0.5 hours x \$86/hour) + (0.60 x Husky valve cost (\$467.54) ÷ 2 year inspection/replacement rate) + (0.35 x OPW valve cost (\$324.55) ÷ 2 year inspection/replacement rate) + (0.05 x FFS P/V Zero gas/E85 fluid cost (\$209) ÷ 2 year inspection rate) = \$245/year. CARB staff uses this equation to estimate maintenance costs per GDF for those GDFs that install a P/V Zero valve under Alternative 2: = (0.5 hours x \$86/hour) + (FFS P/V Zero gas/E85 fluid cost (\$209) ÷ 2 year inspection rate) = \$148/year.

Business-owned GDFs: ISD overpressure alarm response costs

To assess the statewide effect of the proposed amendments on ISD overpressure alarm response costs to GDFs, CARB staff subtracted the estimated alarm response costs under BAU from the estimated costs under the proposed amendments for GDFs predicted to install updated ISD software—as required or voluntarily—under the proposed amendments.

- **\$780** – Average cost to business-owned GDF for each ISD overpressure alarm response.
 - **\$30** – Cost for about 30 minutes of GDF owner/operator or first-line supervisor time to verify the alarm and place an order for a service contractor to conduct a site visit for testing. Based on discussions with GDF operators, CARB staff assumes owners/operators place service orders for 50% of alarms and first-line supervisors place service orders for 50% of alarms. CARB staff assumes a mean hourly wage of \$66.17/hour for owners/operators and \$21.79/hour for supervisors [USBLS, 2019a]. CARB staff assumed these hourly rates are 70.9% of total compensation [USBLS, 2019b]. CARB staff used this equation to estimate the average, total compensation hourly rate: ((50% x \$66.17) + (50% x \$21.79)) ÷ 0.709 = \$62.03 = \$60, rounded to one significant digit.
 - **\$750** – Average cost for one service call by contractor. This estimate includes costs for certified technician time (time on site and travel time), mileage reimbursement for service company vehicle usage, equipment fees, and consumables (Table L-14). The estimate is based on CARB staff’s survey of service contractors.
- Estimated number of annual ISD overpressure alarm responses for business-owned GDFs predicted to install updated ISD software.
 - The number of ISD overpressure alarms per year varies site to site and not all GDFs experience these alarms. Hypermarkets tend to have the highest overpressure alarm frequencies because they typically close overnight and stay closed for longer periods than other retail GDFs.³ Several factors affect the overpressure alarm frequency at non-hypermarket- GDFs, but in general, GDFs with vacuum assist vapor recovery systems (‘assist systems’) have higher

³ As ullage volume increases (more gasoline dispensed), UST ullage pressure stays in vacuum during the day, but then increases overnight when dispensing activity is low or ceases.

overpressure alarm frequencies than GDFs with balance systems.⁴ Consequently, CARB staff used available statewide survey data to estimate average alarm frequencies for different GDF categories and the number of GDFs in each (Tables L-15 and L-16).

- Under the proposed amendments, once updated ISD software that eliminates the overpressure alarms is installed at a GDF, the GDF owner will no longer need to pay for service contractors to respond to ISD overpressure alarms. To develop annual cost estimates under the proposed amendments, CARB staff assumed GDFs complete software installation in December of each year (from 2023 onward, assuming CARB certifies updated software by December 2022) and response costs would cease in January of the following year. Table L-17 provides the number of GDFs predicted to have ISD overpressure alarm response costs each year, a number that decreases each year from 2023 onward as updated software that eliminates overpressure alarms is installed at GDFs.
- To estimate ISD overpressure alarm response costs under BAU, CARB staff multiplied the average response costs per GDF presented in Table L-15 by the number of GDFs in each category in Table L-16. To estimate ISD overpressure alarm response costs under the proposed amendments, CARB staff multiplied the average response costs per GDF presented in Table L-15 by the number of GDFs in each category in Table L-17. The 'Alarm Response Costs' columns in Table L-51 provide the difference between annual costs under BAU and the proposed amendments estimated for GDFs with required and voluntary ISD software installations.

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⁴ There are two types of Phase II vapor recovery systems in California: balance systems and vacuum assist systems. Assist systems use a nozzle with a dedicated vapor return pathway and a dispenser-mounted vacuum pump to collect vapor from the vehicle fuel tank as gasoline is dispensed from the facility storage tank. Balance systems use nozzles with a dedicated low resistance vapor return pathway and rely on direct displacement to pull vapor from the vehicle fuel tank to the GDF storage tank.

Table L-14: Estimation of cost per GDF for authorized service provider (ASP) to respond to and investigate an ISD overpressure alarm

Description	Value
Mileage reimbursement for ASP vehicle usage ^[a] = Average travel distance x Reimbursement rate	\$45
Average round-trip travel distance (miles)	60
Reimbursement rate for mileage (\$/mile) ^[a]	\$0.75
<i>Hours per ASP for service call to respond to ISD OP alarm:</i>	3.7
Travel time for 60 miles round trip [assumed distance given most GDFs are in major urban areas]	1.5
Time onsite to conduct troubleshooting and testing required by Air District permit conditions to identify (potential) vapor recovery system problems ^[b]	2.2
# of ASPs on response ^[c]	1.1
Hourly rate for ASP (\$/hour)	\$86
ASP cost = Hours x Hourly rate x # of ASPs on response	\$350
Average cost of service call including consumables and overhead ^[d] = (2 x ASP cost) + Travel cost [rounded to 2 significant digits]	\$750

[a] Values based on CARB staff survey of 16 service contractors [CARB, 2018e]. The 2018 survey found almost all service contractors charged the ASP rate plus a mileage fee, which ranged from \$0.56 to \$1 per mile and had a median of \$0.74 per mile.

[b] Per a 2020 CARB staff survey of service contractors, ASP time on site ranges from 1 to 3 hours. Based on discussions with contractors and CARB staff field experience, CARB staff assumes ASP time on site is 2 hours for 80 percent of responses, and 3 hours for 20 percent of responses.

[c] Per responses from 14 service contractors to CARB staff's 2018 and 2020 surveys, ASP hourly rates range from \$77 to \$115 and average \$86. May 2018 rates were adjusted for inflation as of March 2020 using the U.S. Bureau of Labor Statistics CPI Inflation Calculator, accessed on April 17, 2020, at: https://data.bls.gov/data/inflation_calculator.htm.

[d] For this estimate, CARB staff multiplied the ASP labor cost by 2 to account for consumables and other overhead expenses, added the vehicle mileage reimbursement cost, and then rounded the sum to two significant digits. CARB staff's review of invoices indicates there are costs beyond ASP labor for responses, such as consumables (e.g., flagging tape and other disposable supplies), contractor laptop fees, and other expenses.

Table L-15: Average annual ISD overpressure alarm response costs per business-owned GDF for GDFs predicted to install updated software under the proposed amendments

DESCRIPTION	ASSIST GDFs			BALANCE GDFs		
	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses
Estimated values for GDFs <u>required</u> to install updated ISD software:						
Average annual number of ISD overpressure alarms per GDF for all GDFs that experience alarms ^[a]	6.0	8.3	6.0	2.3	8.3	2.3
Average annual alarm response costs per GDF estimated for all GDFs that experience alarms ^[b]	\$4,680	\$6,474	\$4,680	\$1,794	\$6,474	\$1,794
		\$4,973 ^[c]			\$2,553 ^[c]	
# of existing GDFs predicted to replace ISD consoles during 2023-2030 and to respond to ISD OP alarms under BAU [from Table L-9]	165	156	799	121	114	586
# of new GDFs predicted to be constructed during 2023-2030 and to respond to ISD OP alarms under BAU [from Table L-9]	151	16	82	111	11	60
Estimated values for GDFs that <u>voluntarily</u> install updated ISD software:						
Average annual number of ISD overpressure alarms per GDF for GDFs predicted to voluntarily install updated ISD software ^[d]	6.6	8.8	6.3	4.0	8.8	2.9
Average annual alarm response costs per GDF for GDFs predicted to voluntarily install updated ISD software ^[a]	\$5,148	\$6,864	\$4,914	\$3,120	\$6,864	\$2,262
		\$5,232 ^[c]			\$3,154 ^[c]	
Maximum number of existing GDFs predicted to voluntarily install updated ISD software during between 2023 and 2026	1,727	57	294	712	41	172
Maximum number of new GDFs predicted to be constructed during 2021-2022 and to voluntarily install updated ISD software between 2023 and 2026	34	4	19	14	3	11

[a] CARB staff estimated ISD overpressure alarm frequencies for the different GDF categories [CARB, 2020n] based on ISD alarm records downloaded for a recent three-year period (November 2015 through October 2018) by a CARB statewide field survey of approximately 300 retail GDFs throughout the state [CARB, 2020b, Appendix III]. CARB staff adjusted the frequencies for assist GDFs to account for recently adopted nozzle dimension requirements and anticipated reductions (46% frequency reduction at 80% of sites) from installation of the Franklin Fueling Systems' Healy model 900 assist EOR nozzle and site optimization [CARB,

2020n]. See Table L-9 footnote [c] for additional information about the anticipated reductions. The statewide field survey [CARB, 2020b] found that 100% of hypermarkets with assist systems had one or more alarms per year [CARB, 2020c], averaging 3.8 alarms per year if it is assumed 80% will experience a 46% reduction in annual alarms after installing EOR nozzles and optimizing their systems. However, the owner of 110 of the largest hypermarkets in California stated in 2018 that their GDFs (all with assist systems, and all close during the night for longer periods than most other hypermarkets, 8 or 9 hours compared to 6 or 7 hours) averaged 20 alarms per year, which equates to approximately 88 of their GDFs (0.8×110 GDFs) averaging 10.8 alarms per year ($54\% \times 20$ alarms/year) if adjusted for EOR nozzle installation and site optimization, and the other 22 GDFs ($20\% \times 110$ GDFs) remaining with 20 alarms/year. Air Districts reported 217 assist hypermarkets [CARB, 2020a]. CARB staff estimated the average annual alarm frequency of assist hypermarkets using this equation: $= (88/217 \times 10.8 \text{ alarms/year}) + (22/217 \times 20 \text{ alarms per year}) + ((217-88-22)/217 \times 3.8 \text{ alarms per year}) = 8.3 \text{ alarms/year}$. The Blitz monitoring did not include any balance hypermarkets; CARB staff assumed balance hypermarkets have the same distribution of alarm frequencies as assist hypermarkets.

- [b] Average annual ISD overpressure alarm response costs per GDF are estimated by multiplying the average annual alarm frequency for each category by \$780, the estimated cost to a GDF owner per alarm response.
- [c] Weighted average annual alarm response costs per GDF for hypermarkets and other business-owned GDFs (not including small business-owned GDFs) that experience alarms used to estimate statewide costs for GDFs that are not owned by small businesses.
- [d] The statewide field survey [CARB, 2020b] found that 93% of hypermarkets with assist systems had ≥ 0.4 alarms per year (the estimated 'break-even' threshold for cost-effectiveness of installing updated IDS software), averaging 4.1 alarms per year if it is assumed 80% of assist GDFs will experience a 46% reduction in annual alarms after installing EOR nozzles and optimizing their systems. However, the owner of 110 of the largest hypermarkets in California stated in 2018 that their GDFs (all with assist systems, and all close during the night for longer periods than most other hypermarkets, 8 or 9 hours compared to 6 or 7 hours) averaged 20 alarms per year, which equates to approximately 88 of their GDFs (0.8×110 GDFs) averaging 10.8 alarms per year ($54\% \times 20$ alarms/year) if adjusted for EOR nozzle installation and site optimization, and the other 22 GDFs ($20\% \times 110$ GDFs) remaining with 20 alarms/year. Air Districts reported 217 assist hypermarkets [CARB, 2020a]; CARB staff assumes 93% (202) of these have ≥ 0.4 alarms per year. CARB staff estimated the average annual alarm frequency of assist hypermarkets using this equation: $= (88/202 \times 10.8 \text{ alarms/year}) + (22/202 \times 20 \text{ alarms per year}) + ((202-88-22)/202 \times 4.1 \text{ alarms per year}) = 8.8 \text{ alarms/year}$. The statewide survey did not include any balance hypermarkets; CARB staff assumed balance hypermarkets have the same distribution of alarm frequencies as assist hypermarkets.

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Table L-16: Estimated number of existing and new business-owned GDFs that respond to alarms under BAU each year and are predicted to install updated ISD software under the proposed amendments ^[a]

Category		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Estimated number of GDFs that have ISD overpressure alarms under BAU and could be <u>required</u> to install updated ISD software under the proposed amendments: ^[b]											
Assist:	Small CA Business	165	165	165	184	203	222	241	260	279	297
	Other Businesses	955	955	955	968	980	992	1004	1016	1028	1040
Balance:	Small CA Business	121	121	121	135	149	163	177	191	205	218
	Other Businesses	700	700	700	709	718	727	736	745	754	762
Estimated maximum number of GDFs that have ISD overpressure alarms under BAU and are predicted to <u>voluntarily</u> install updated ISD software under the proposed amendments to reduce operating costs: ^[c]											
Assist:	Small CA Business	1727	1744	1761	1761	1761	1761	1761	1761	1761	1761
	Other Businesses	351	363	374	374	374	374	374	374	374	374
Balance:	Small CA Business	712	719	726	726	726	726	726	726	726	726
	Other Businesses	213	220	227	227	227	227	227	227	227	227

[a] These values are used to estimate response costs under BAU for comparison to response costs under the proposed amendments. To simplify calculations, CARB staff assumed construction of all new GDFs is completed in December of each year and therefore response costs would not begin until the following year.

[b] The estimated number of GDFs required to install updated ISD software begins to increase in 2023 because once the updated ISD software under the proposed amendments has been certified by CARB (anticipated by December 2022), new GDFs would be required to install ISD systems with the updated software at the time of construction.

[c] The estimated maximum number of GDFs that voluntarily installs updated ISD software increases as new GDFs are constructed until 2023 based on the assumption that new GDFs constructed in 2021 and 2022 will have the same distribution of ISD overpressure alarm frequencies as existing GDFs. The number stops increasing in 2023 because, once the updated ISD software under the proposed amendments has been certified by CARB (anticipated by December 2022), new GDFs constructed in 2023 onward would be required to install ISD systems with the updated software at the time of construction and would not experience any overpressure alarms nor associated alarm response costs.

Table L-17: Estimated number of GDFs under the proposed amendments that respond to ISD overpressure alarms until they install updated ISD software

Category		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Estimated number of GDFs <u>required</u> to install updated ISD software under the proposed amendments that have overpressure alarms until they install the updated software: ^[a, b]											
Assist:	Small CA Business	165	165	165	144	123	102	81	60	39	18
	Other Businesses	955	955	955	836	717	598	479	360	241	122
Balance:	Small CA Business	121	121	121	106	91	76	61	46	31	16
	Other Businesses	700	700	700	612	524	436	348	260	172	84
Estimated maximum number of GDFs predicted to <u>voluntarily</u> install updated ISD software and have overpressure alarms until they install the updated software: ^[a]											
Assist:	Small CA Business	1,727	1,744	1,761	1,321	881	441	0	0	0	0
	Other Businesses	351	363	374	280	186	92	0	0	0	0
Balance:	Small CA Business	712	719	726	544	362	180	0	0	0	0
	Other Businesses	213	220	227	170	113	56	0	0	0	0

- [a] To simplify calculations, CARB staff assumed GDFs complete installation of updated ISD software in December of each year (from 2023 onward, assuming CARB certifies updated software by December 2022) and therefore response costs would cease at the beginning of the following year.
- [b] New GDFs required to install updated ISD software at the time of construction once the software is certified by CARB (anticipated by December 2022) are not included in these counts because, under the proposed amendments, they would never experience any ISD overpressure alarms nor associated alarm response costs.

Local government:

Air Districts: ISD software certification process

The proposed amendments would require the two current ISD manufacturers to remove the ISD overpressure alarm criteria from their ISD software, and add the additional pressure report and storage capability, the next time they seek CARB certification. Air Districts participate in the certification process by issuing research and development (R&D) permits for certification test sites and by providing review of CARB staff’s draft certification Executive Orders. The following cost estimates assume both ISD manufacturers will redesign and test software in FY2021/22, and complete the CARB certification process in FY2022/23.

- **\$7,172** – Total one-time costs assumed to occur in FY2021/22.
 - Based on February 2020 Air District survey responses [CARB, 2020a], CARB staff estimates an average cost of \$1,793 for the local Air District to develop an R&D permit for one certification test site. Assuming the two ISD manufacturers each apply for two test sites, total Air District permitting costs would be \$3,586 per manufacturer and \$7,172 in FY2021/22. These costs are recovered through service charges and fees invoiced to and paid by ISD system manufacturers and therefore would have no net impact on the Air Districts.

- **\$4,000** - Total one-time costs assumed to occur in FY2022/23.
 - Typically 5 to 10 Air Districts provide comments on CARB staff's draft certification Executive Orders. The Chair of the CAPCOA Vapor Recovery Subcommittee (VRS) typically compiles written review comments from the Air Districts into one document to submit to CARB. For these cost estimates, CARB staff assumes seven Air Districts spend an hour each to write comments, the VRS chair (typically one of the commenters) spends two hours compiling comments and communicating with the other commenters for clarification, and then the seven commenters participate in an hour-long meeting with CARB staff to discuss CARB staff's responses to their comments. Based on February 2020 Air District survey responses, CARB staff estimates a statewide average Air District engineer hourly rate of \$125. CARB staff uses this equation to estimate total review costs for seven Air Districts: = 2 draft Orders x 16 hours per Order x \$125/hour = \$4,000 for 2 draft Orders. These costs are not recoverable from ISD manufacturers nor reimbursable by the State because State law (Health and Safety Code § 41954(e)) specifies which agencies can charge a fee for certification costs, not to exceed actual costs, and has no provisions for Air Districts to charge a fee or be reimbursed for time spent on reviewing and commenting on certification Executive Orders.

Local government-owned GDFs: ISD software purchase, permitting, and installation

After CARB certification of the updated ISD software, the new ISD software would be required for all installations at new GDFs at the time of their construction and major modifications at existing GDFs. GDF owners and operators of other existing GDFs would not be required to install the updated software, but could voluntarily choose to install the updated software based on their site-specific assessments of potential cost savings.

- **4 GDFs** – Number of GDFs owned by local government that install updated ISD software. Per a February 2020 Air District survey, local agencies operate four GDFs with ISD systems. CARB staff assumes no new GDFs will be constructed during 2021 through 2030. To provide conservative cost estimates, CARB staff assumes all four existing GDFs would install updated ISD software under the proposed amendments, and that they would have similar costs and overpressure alarm frequencies as the large business-owned GDFs described earlier.
 - **2 GDFs** – Estimated number of existing GDFs required to replace ISD software at the time of major modification.
 - **0 to 2 GDFs** - Estimated range of existing GDFs that may voluntarily install updated ISD software.
 - Table L-18 provides the assumed timing of required and voluntary software installations for existing GDFs owned by local and federal agencies assumed for the purpose of estimating annual and total costs.

- CARB staff assumed local governments would not obtain loans for capital and installation costs.
- **\$20** – Additional one-time cost per GDF for updated ISD software estimated for GDFs required to install updated ISD software (existing GDFs with major modifications) compared to BAU. This estimate assumes local agencies would have the same costs as businesses.
- **\$3,091** – Additional one-time cost per GDF estimated for government-owned GDFs that voluntarily install updated ISD software compared to BAU. This estimate assumes local agencies would have the same costs as businesses.
 - **\$311** – One-time, statewide average cost per GDF for Air District and CUPA permit fees.
 - **\$1,410** – One-time, statewide average purchase cost per GDF for updated ISD software.
 - **\$1,370** – One-time, statewide average cost per GDF for software installation.

Local government-owned GDFs: ISD overpressure alarm response costs

To assess the statewide effect of the proposed amendments on ISD overpressure alarm response costs to GDFs, CARB staff subtracted the estimated alarm response costs under BAU from the estimated costs under the proposed amendments for GDFs predicted to install updated ISD software—as required or voluntarily—under the proposed amendments. CARB staff assumes government-owned GDFs have the same response costs and ISD overpressure alarm frequency distribution as large business-owned GDFs described earlier. To estimate ISD overpressure alarm response costs under BAU, CARB staff multiplied the average response costs per GDF presented in Table L-19 by the number of GDFs in each category in Table L-20. To estimate ISD overpressure alarm response costs under the proposed amendments, CARB staff multiplied the average response costs per GDF presented in Table L-19 by the number of GDFs in each category in Table L-21. The ‘Alarm Response Costs’ columns in Table L-59 provides the difference between annual costs under BAU and the proposed amendments.

Federal government-owned GDFs: ISD software purchase, permitting, and installation, and ISD overpressure alarm response costs

Cost impacts to federal government are not required for Form 399 but are included here to support evaluation of impacts on local permitting agencies, service contractors, and ISD manufacturers.

- **6 GDFs** – Number of GDFs owned by federal government that install updated ISD software. Based on a February 2020 Air District survey, CARB staff estimated that federal agencies operate about six GDFs with ISD systems. CARB staff assumes no new federal GDFs will be constructed during 2021 through 2030. To provide conservative cost estimates, CARB staff assumes all six existing GDFs would install updated ISD software under the proposed amendments, and that they would have

similar costs and overpressure alarm frequencies as the large business-owned GDFs described earlier.

- **4 GDFs** – Estimated number of existing GDFs required to replace ISD software at the time of major modification.
- **0 to 2 GDFs** - Estimated range of existing GDFs that may voluntarily install updated ISD software.
- Table L-18 provides the assumed timing of required and voluntary software installations for existing GDFs owned by local and federal agencies assumed for the purpose of estimating annual and total costs.
- CARB staff assumed federal governments would not obtain loans for capital and installation costs.
- **\$20** – Additional one-time cost per GDF for updated ISD software estimated for GDFs required to install updated ISD software (existing GDFs with major modifications) compared to BAU. This estimate assumes federal agencies would have the same costs as businesses.
- **\$3,091** – Additional one-time cost per GDF estimated for government-owned GDFs that voluntarily install updated ISD software compared to BAU. This estimate assumes federal agencies would have the same costs as businesses.
 - **\$311** – One-time, statewide average cost per GDF for Air District and CUPA permit fees.
 - **\$1,410** – One-time, statewide average purchase cost per GDF for updated ISD software.
 - **\$1,370** – One-time, statewide average cost per GDF for software installation.
- ISD overpressure alarm response costs. To assess the indirect impact of the proposed amendments on service contractors, it is necessary to estimate ISD overpressure alarm response costs to federally-owned GDFs. CARB staff assumes government-owned GDFs have the same response costs and ISD overpressure alarm frequency distribution as large business-owned GDFs described earlier. To estimate ISD overpressure alarm response costs under BAU, CARB staff multiplied the average response costs per GDF presented in Table L-19 by the number of GDFs in each category in Table L-20. To estimate ISD overpressure alarm response costs under the proposed amendments, CARB staff multiplied the average response costs per GDF presented in Table L-19 by the number of GDFs in each category in Table L-21. The 'Alarm Response Costs' columns in Table L-22 provides the difference between annual costs under BAU and the proposed amendment. These cost-savings for federal GDF owners have indirect impacts in the form of reduced revenue on service companies with certified technicians contracted by GDF owners to respond to ISD overpressure, in the absence of Advisory 405.

Table L-18: Assumed timing of updated ISD software installations at government-owned GDFs under the proposed amendments

Category	2023	2024	2025	2026	2027	2028	2029	2030
Estimated number of local government-owned GDFs with ISD:								
Required	0	0	0	1	0	1	0	0
Voluntary	0	1	1	0	0	0	0	0
Estimated number of federal government-owned GDFs with ISD:								
Required	1	0	1	0	1	0	1	0
Voluntary	0	1	1	0	0	0	0	0

Table L-19: Assumed average annual ISD overpressure alarm response costs per government-owned GDF

Description	Local Government ^[a]		Federal Government ^[a]	
	Assist GDFs	Balance GDFs	Assist GDFs	Balance GDFs
Estimated values for GDFs <u>required</u> to install updated ISD software:				
Average annual number of ISD overpressure alarms per GDF for all GDFs that experience alarms	6.0	2.3	6.0	2.3
Average annual alarm response costs per GDF estimated for all GDFs that experience alarms ^[b]	\$4,680	\$1,794	\$4,680	\$1,794
# of existing GDFs predicted to replace ISD consoles during 2023-2030 and to respond to ISD OP alarms under BAU	1	1	2	1
Estimated values for GDFs that <u>voluntarily</u> install updated ISD software:				
Average annual number of ISD overpressure alarms per GDF for GDFs predicted to voluntarily install updated ISD software	6.3	2.9	6.3	2.9
Average annual alarm response costs per GDF for GDFs predicted to voluntarily install updated ISD software ^[b]	\$4,914	\$2,262	\$4,914	\$2,262
# of existing GDFs predicted to voluntarily install updated ISD software during 2023-2026	1	1	1	1

[a] CARB staff assumes all government-owned GDFs would install updated ISD software under the proposed amendments, and that they would have similar costs and overpressure alarm frequencies as the large business-owned GDFs.

[b] Average annual ISD overpressure alarm response costs per GDF are estimated by multiplying the average annual alarm frequency for each category by \$780, the estimated cost to a GDF owner per alarm response.

Table L-20: Estimated number of government-owned GDFs that respond to alarms under BAU ^[a]

Category		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Estimated number of local government-owned GDFs with ISD:											
Required:	Assist	1	1	1	1	1	1	1	1	1	1
	Balance	1	1	1	1	1	1	1	1	1	1
Voluntary:	Assist	1	1	1	1	1	1	1	1	1	1
	Balance	1	1	1	1	1	1	1	1	1	1
Estimated number of federal government-owned GDFs with ISD:											
Required:	Assist	2	2	2	2	2	2	2	2	2	2
	Balance	1	1	1	1	1	1	1	1	1	1
Voluntary:	Assist	1	1	1	1	1	1	1	1	1	1
	Balance	1	1	1	1	1	1	1	1	1	1

[a] CARB staff assumes all government-owned GDFs would install updated ISD software under the proposed amendments, and that they would have a similar distribution of assist and balance vapor recovery system types and similar distribution of ISD overpressure alarm frequencies as large business-owned GDFs. CARB staff assumed that nine of the ten government-owned GDFs would experience ISD overpressure alarms.

Table L-21: Estimated number of government-owned GDFs under the proposed amendments that respond to ISD overpressure alarms until they install updated ISD software

Category		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Estimated number of local government-owned GDFs with ISD: ^[a]											
Required:	Assist	1	1	1	1	1	1	0	0	0	0
	Balance	1	1	1	1	1	1	1	1	0	0
Voluntary:	Assist	1	1	1	1	0	0	0	0	0	0
	Balance	1	1	1	1	1	0	0	0	0	0
Estimated number of federal government-owned GDFs with ISD: ^[a]											
Required:	Assist	2	2	2	1	1	1	1	0	0	0
	Balance	1	1	1	1	1	0	0	0	0	0
Voluntary:	Assist	1	1	1	1	0	0	0	0	0	0
	Balance	1	1	1	1	1	0	0	0	0	0

[a] To simplify calculations, CARB staff assumed GDFs complete installation of updated ISD software in December of each year (from 2023 onward, assuming CARB certifies updated software by December 2022) and therefore response costs would cease at the beginning of the following year.

Table L-22: Estimated difference in direct costs of proposed amendments compared to BAU for GDFs owned by federal agencies^[a]

Fiscal Year	A. Estimated potential costs for GDFs <u>required</u> to install updated ISD software			B. Estimated potential maximum costs for GDFs that <u>voluntarily</u> install updated ISD software		
	Alarm Response Costs	Permit Costs	Capital & Installation Costs	Alarm Response Costs	Permit Costs	Capital & Installation Costs
2021/22	\$0	\$0	\$0	\$0	\$0	\$0
2022/23	\$0	\$0	\$0	\$0	\$0	\$0
2023/24	\$0	\$0	\$20	\$0	\$0	\$0
2024/25	(\$4,680)	\$0	\$0	\$0	\$311	\$2,780
2025/26	(\$4,680)	\$0	\$20	(\$4,992)	\$311	\$2,780
2026/27	(\$6,474)	\$0	\$0	(\$7,254)	\$0	\$0
2027/28	(\$6,474)	\$0	\$20	(\$7,254)	\$0	\$0
2028/29	(\$11,154)	\$0	\$0	(\$7,254)	\$0	\$0
2029/30	(\$11,154)	\$0	\$20	(\$7,254)	\$0	\$0
2030/31	(\$11,154)	\$0	\$0	(\$7,254)	\$0	\$0
Total:	(\$55,770)	\$0	\$80	(\$41,262)	\$622	\$5,560

[a] Only the proposed amendments to the ISD software requirements have a direct impact on government-owned GDFs.

Air Districts: Permitting costs for updated ISD software installation at GDFs

Under the proposed amendments, from 0 to 3,088 business-owned GDFs may voluntarily install updated ISD software between 2023 and 2026, and from 0 to 4 government-owned GDFs may voluntarily install updated software. These actions could have an impact on some Air District permitting programs. Of the 11 Air Districts that responded to a CARB 2020 survey and 4 additional Districts that responded to a 2014 survey, only 1 Air District (San Luis Obispo Air District) requires GDF owners and operators to obtain a permit to install updated software updates with a permit fee of \$220. The other 14 Air Districts that responded encompass more than 89 percent of GDFs statewide and do not require a permit for ISD software updates. This indicates that up to about 11 percent of GDFs that voluntarily install updated ISD software may require Air District permits not otherwise required under BAU, assuming such GDFs are evenly distributed across the state. This could equate to as many as 340 additional permit applications compared to BAU, as estimated by this equation:

$$= 11\% \times (3,088 \text{ business-owned GDFs} + 4 \text{ government-owned GDFs}) = 340 \text{ GDFs.}$$

Assuming the affected Air Districts have similar fee rates as the Air District that responded to the survey, the proposed amendments could result in new permitting costs for Air Districts up to about \$74,800 between FY2022/23 through FY2026/27 (i.e., 340 GDF permit applications x \$220 per application). These permitting costs are fully recovered from GDF owners because Air Districts have legal authority under Health and Safety Code § 40510 and § 42311 to recover related costs by imposing fees. As a result, CARB staff assumed the

permitting costs that could result from the proposed amendments would be fully recovered from GDF owners and operators and therefore would have no net fiscal impact on Air Districts.

CUPAs: Permitting costs for updated ISD software installation at GDFs

Under the proposed amendments, from 0 to 3,088 business-owned GDFs may voluntarily install updated ISD software between 2023 and 2026, and from 0 to 4 government-owned GDFs may voluntarily install updated software. These actions could have an impact on some CUPA permitting programs. Of the twelve CUPAs that responded to a CARB 2020 survey, only four require permits for ISD software updates: San Diego County (\$1,501), Ventura County (\$1,137), Bakersfield (fee amount not provided), and Santa Fe Springs (\$800). These four CUPAs regulate about 1,010 GDFs. The other eight CUPAs that responded to the survey regulate about 3,323 GDFs and include the Counties of Alameda, Los Angeles, Orange, Riverside, Sacramento, San Joaquin, and Solano, and the City of Anaheim.

The survey results indicate that about a fourth of GDFs [$1,010 \text{ GDFs} \div (1,010 \text{ GDFs} + 3,323 \text{ GDFs})$] that voluntarily install updated ISD software under the proposed amendments may require CUPA permits, assuming such GDFs are evenly distributed across the state, and CUPA costs per permit could average about \$1,146. This could equate to as many as about 773 additional permit applications (i.e., $25\% \times (3,088 \text{ business-owned GDFs} + 4 \text{ government-owned GDFs})$) and new permitting costs for CUPAs up to about \$885,858 between FY2022/23 through FY2026/27 (i.e., $773 \text{ GDF permit applications} \times \$1,146 \text{ cost per permit}$). These permitting costs are fully recovered from GDF owners because CUPAs have legal authority to recover related costs by imposing fees. As a result, CARB staff assumed the permitting costs that could result from the proposed amendments would be fully recovered from GDF owners and operators and therefore would have no net fiscal impact on CUPAs.

State government:

The proposed amendments would require the two current ISD manufacturers to remove the ISD overpressure alarm criteria from their ISD software, and add the additional pressure report and storage capability, the next time they seek CARB certification. An Air District survey conducted in March 2020 indicates no state agencies own or operate any GDFs with ISD. Consequently, this proposed amendment impacts only state agencies that participate in the ISD software certification process.

State law requires CARB to coordinate certification procedures with:

- Department of Food and Agriculture, Division of Measurement Standards (DMS)
- Department of Forestry and Fire Protection, Office of the State Fire Marshall (SFM)
- Department of Industrial Relations, Division of Occupational Safety and Health (DOSH)
- State Water Resources Control Board (SWRCB), Division of Water Quality

Prior to certification of the vapor recovery system by the CARB Executive Officer, the manufacturers are required to submit plans and specifications for their system or component to each of these agencies. These agencies may conduct certification review and testing concurrently with CARB certification testing; however, the approval of the SFM, DMS, DOSH, and a determination by the SWRCB are a precondition to certification by CARB. Manufacturers are responsible for providing documentation of these approvals and determinations to CARB.

Based on past certification processes for ISD software updates and other vapor recovery equipment, these estimates assume DMS and SWRCB will not conduct reviews of the two certifications for updated ISD software because: (a) DMS does not conduct reviews for ISD systems and other equipment not related to gasoline metrology (accuracy of measurements of how much gasoline is dispensed through the nozzles); and (b) SWRCB does not conduct reviews for ISD systems and other Phase II equipment that is above ground.

The itemized list below provides an explanation of the methodology, staff assumptions, and data used in quantifying the costs for each agency. The following cost estimates assume both ISD manufacturers will redesign software in FY2021/22, and complete the CARB certification process in FY2022/23.

CARB: ISD software certification process

There are one-time costs for CARB certification staff to test updated ISD software at a working GDF. CARB costs are fully recovered from the ISD manufacturers because CARB has legal authority to charge fees to recover certification testing costs.⁵ CARB staff assumed the certification costs that could result from the proposed amendments would be fully recovered from ISD manufacturers and therefore would have no net fiscal impact on CARB.

CARB certification steps are outlined by the CARB website, "[Vapor Recovery Certification Process - Gasoline Dispensing Facilities](#)", and detailed requirements are described in CP-201, CP-206, and CP-207. The following cost estimates are based on CARB staff's review of recent certification invoices and communications with ISD manufacturers.

- **\$64,110** – Total one-time costs assumed to occur in FY2022/23.
 - **\$32,055** per manufacturer certification applicant. This is the estimated cost CARB staff time and expenses to do the following:
 - Review the application for compliance with regulations, identify deficiencies in the application (including comments from the California

⁵ Health and Safety Code § 41954(e) states that CARB may charge a reasonable fee for certification of a gasoline vapor control system or a component thereof, not to exceed the actual cost. CARB certification evaluation costs include evaluating the certification application, conducting testing, writing the certification documents, and responding to comments from Air Districts and applicable manufacturers.

Air Pollution Control Officers Association (CAPCOA) reviewer), and respond to manufacturer’s responses to deficiencies.

- Determine if test site(s) meet applicable regulatory requirements, visit test site(s), install data acquisition system, and conduct initial test of Phase I and II systems to ensure proper operation.
 - Write a letter indicating start date of testing, testing frequencies (repeatability) and type of test to be conducted (specified by CP-201 and applicable test procedure such as TP-201.2I or by manufacturer due to unique design or configuration.
 - Write draft certification documents (Executive Order and Exhibits, Installation, Operation, and Maintenance (IOM) Manual, and other documents supporting certification) for review by the manufacturer and CAPCOA.⁶
 - Write draft responses to comments and discuss responses with CAPCOA, verify that CARB has received state agency approvals or determination, complete final certification document, submit for signature, and post on CARB website when signed.
- Table L-23 describes the estimated costs for each certification activity.

Table L-23: Calculations and assumptions used to estimate one-time costs for CARB certification testing of updated ISD software assumed to take place in FY2022/23 under the proposed amendments and Alternative 2

Descriptions, calculations and assumptions:	Proposed Amendments	Alternative 2
# of ISD system manufacturers applying for CARB certification	2	2
# of test sites per certification application	2	2
Region of test sites	Sacramento	Sacramento
Total # of initial test site visits by CARB staff per application to determine whether test sites meet applicable regulatory requirements, install data acquisition systems, and conduct initial tests of Phase I and II systems to ensure proper operation	2	2
Total # of site visits to conduct testing by CARB staff per application to conduct testing, first at the beginning of the test period, then every 30 days ^[a]	8	8
CARB certification staff hourly rate ^[b]	\$95	

⁶ CAPCOA is comprised of Air Districts, which are responsible for verifying the updated ISD software is installed, operated, and maintained at GDFs per the Executive Order.

Descriptions, calculations and assumptions:	Proposed Amendments	Alternative 2
Travel expenses per application for CARB staff to conduct equipment testing = # of site visits per certification application (2 initial site visits + 8 site visits to conduct testing) x travel expense per site visit (\$34.50) Mileage reimbursement for CARB vehicle usage per Sacramento test site visit (travel distance x reimbursement rate) Average round-trip travel distance to test site from CARB office Reimbursement rate (\$/mile) [federal standard mileage rate]	\$345 \$34.50 60 miles \$0.575	\$345 \$34.50 60 miles \$0.575
Total CARB staff hours for each application to: Review application, conduct preparatory site visits, and notify manufacturer when CARB testing will begin and duration of testing via "site seal letter" = 60 hours/test site x # of test sites	330 120	372 120
Conduct site visits for CARB vapor recovery certification testing and assess downloaded ISD system pressure data for each manufacturer certification application = # of site visits to conduct testing x # of hours per person x # of staff # of staff conducting site testing Travel time per site visit per person Hours per site visit to conduct testing per person	96 2 1.5 4.5	96 2 1.5 4.5
Assess all downloaded data = # of site visits to conduct testing x # of hours assessment time per site visit CARB staff estimates 8 hours will be needed under the proposed amendments, and 12 hours under Alternative 2, after each site visit for staff to manually compile and calculate the UST ullage pressure ranges using downloaded pressure data, compare manually calculated values to ISD-generated daily and monthly pressure reports to ensure ISD software calculations are correct, and complete management review.	64	96
Prepare draft Executive Order and Certification Summary, complete CARB management/multi-division review, submit for review by manufacturer and local Air Districts, amend draft as needed to address comments received, issue the Executive Order and IOM (Installation, Operation and Maintenance Manual), and upload to the vapor recovery program webpage for stakeholder/public access	50	60
Cost for CARB staff time for certification process for each manufacturer certification application = Total Hours x Hourly rate	\$31,350	\$35,340
Equipment expenses for each manufacturer certification application = Hours on-site per site visit to conduct testing x # of site visits x \$10/hour	\$360	\$360
Total CARB cost per manufacturer certification application = Travel expenses + Equipment expenses + CARB staff time expenses	\$32,055	\$36,045
Total one-time costs for CARB in 2022/2023 = Total CARB cost per manufacturer certification application x # of manufacturers	\$64,110	\$72,090

- [a] CARB certification testing typically requires at least 180 days, but CARB staff expects ISD software update challenge testing could be completed in 90 days if there are no problems during the first attempt and manufacturer is not requesting certification of new hardware such as vapor flowmeter or pressure sensor.
- [b] Hourly rate = $((\$203,000 + \$193,000)/2) \div 2080 = \$95.19 = \$95$ (rounded). Per CARB Administrative Services Division, as of May 2020, position costs for the two classifications for the budgeted year (including overhead, staff benefits, etc.) are: 1) Air Resources Engineer – \$203,000/year; 2) Air Pollution Specialist – \$193,000/year. Average the two, as staff are split, and divide the average annual salary by 2080 hours (52 weeks x 40 hours/week).

SFM: ISD software certification process

There are one-time costs for Department of Forestry and Fire Protection's Office of the State Fire Marshall (SFM) staff to review updated ISD software and issue an approval letter. CARB cannot complete the certification process without receipt of the SFM approval letter.

SFM has legal authority under the Health and Safety Code to charge fees to recover certification costs.⁷ As a result, CARB staff assumed the review costs that could result from the proposed amendments would be fully recovered from ISD manufacturers and therefore would have no net fiscal impact on SFM.

- **\$170** – Total one-time costs assumed to occur in FY2022/23.
 - **\$85** per manufacturer certification applicant.
 - SFM staff informed CARB staff that the fee for full vapor recovery system review is \$135 and for review of a component or system change is \$85. Based on recent discussion with the SFM, CARB staff expects the SFM staff review costs would be about \$85 for component review and approval letter for updated ISD software.

DOSH: ISD software certification process

There are one-time costs for Department of Industrial Relations' Division of Occupational Safety and Health (DOSH) staff to review updated ISD software and issue a certification letter. CARB cannot complete the certification process without receipt of the DOSH certification letter. DOSH has legal authority under the Health and Safety Code to charge fees to recover the costs of certification.⁸ As a result, CARB staff assumed the review costs that could result from the proposed amendments would be fully recovered from ISD manufacturers and therefore would have no net fiscal impact DOSH.

- **\$480** – Total one-time costs assumed to occur in FY2022/23.
 - **\$240** per manufacturer certification applicant.

⁷ Section 41961 authorizes State Fire Marshal and the Division of Occupational Health and Safety to charge a reasonable fee for certification of a gasoline vapor control system or a component, thereof, not to exceed their respective estimated cost.

⁸ See Footnote 7.

- DOSH charges a minimum of two hours at \$70 per hour plus \$30 for a letter of certification. For two recent vapor recovery system component reviews, DOSH invoiced \$170 and \$240 (2-3 hours plus letter fee). For this estimate, CARB staff assumed 3 hours plus letter fee is equivalent to DOSH costs for review and certification letter for updated ISD software.

Indirect costs and cost-savings under proposed amendments

The itemized list below describes potential indirect costs under the proposed amendments for changes to ISD software requirements intended to eliminate ISD overpressure alarms.

ISD manufacturers: Increased revenue

As described above and later in the Economic Impact Statement, CARB staff estimated 3,098 business-owned GDFs and 6 GDFs owned by federal and local government would be required to install updated ISD software under the proposed amendments between 2023 and 2030. Under the proposed amendments, updated ISD software would cost about \$20 more compared to BAU. This equates to about \$62,080 (3,104 GDFs x \$20) in additional revenue for ISD manufacturers.

As described above and later in the Economic Impact Statement, CARB staff estimated as many as 3,088 business-owned GDFs and 4 GDFs owned by federal and local government would voluntarily install updated ISD software under the proposed amendments. Under the proposed amendments, the purchase price of updated ISD software would be about \$1,410. This equates to about \$4,359,720 (3,092 GDFs x \$1,410) in additional revenue for ISD manufacturers.

Annualized estimates are provided in Table L-50.

Service companies: Net reduction in revenue

In the absence of Advisory 405, as GDF owners hire service contractors to install updated ISD software, average annual revenue for service contractors would increase. However, service contractor revenue is expected to decrease as an increasing number of GDFs no longer require overpressure alarm responses by the contracted service technicians.

- \$4,236,040 – Revenue increase. CARB staff predicts as many as 3,088 business-owned GDFs and 4 GDFs owned by federal and local government may voluntarily install updated ISD software between 2023 and 2026, in the absence of Advisory 405. This equates to a revenue increase of about \$4,236,040 (3,092 x \$1,370) for service contractors.
- \$104,906,985 – Revenue decrease. In the absence of Advisory 405, CARB staff predicts business- and government-owned GDFs may have a total cost-savings of up to about \$109 million between 2023 and 2030 as a result of foregone ISD overpressure alarm response costs. As described earlier, a single alarm response costs a GDF owner about \$780, and about \$750 of this cost is paid to a service company

contracted to trouble-shoot alarms. As a result, cost-savings for GDF owners equate to a revenue reduction for service contractors.

- Annualized estimates are provided in Table L-50.

Retail GDF customers: Potential passed-through cost-savings

In the absence of Advisory 405, if retail GDFs were to fully pass on cost-savings from elimination of ISD overpressure alarm response costs to customers, the amount of cost-savings could vary depending on a GDF's site-specific number of foregone alarms and the amount of gasoline a GDF dispenses. Table L-24 provides examples of potential passed-through cost-savings that customers could experience at the pump. The more alarms a GDF experienced before installing updated ISD software, the greater the cost-savings after installation. At the same time, the more gasoline dispensed, the smaller the cost-savings per gallon to the customer. Cost-savings for the customer could range from \$0.0001 per gallon at a hypermarket with monthly throughput of 1 million gallons that avoids 1 alarm responses per year, to \$0.01 per gallon at a GDF with monthly throughput of 140,000 gallons (statewide average throughput for retail GDFs not including hypermarkets) that avoids 22 alarm responses per year.

Table L-25 provides potential statewide average cost-savings for two scenarios, required ISD software installations, and required plus voluntary installations. On a statewide basis, cost-savings for the customer could range from \$0.0007 to \$0.002 per gallon. These estimates encompass all retail GDFs throughout California, not just those that install updated ISD software.

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Table L-24: Examples of potential passed-through cost-savings to retail GDF customers depending on retail GDF throughput and number of foregone ISD overpressure alarms, in the absence of Advisory 405

Scenario	Hypermarket that dispenses 1 million gallons of gasoline per month	GDF that dispenses 140,000 gallons of gasoline per month
Savings if GDF no longer has 1 alarm per year: ^[a]		
Savings per year for GDF owner ^[b]	\$780	\$780
Potential passed-through savings per gallon for customer ^[c]	\$0.0001	\$0.0005
Savings if GDF no longer has 4 alarms per year:		
Savings per year for GDF owner	\$3,120	\$3,120
Potential passed-through savings per gallon for customer	\$0.0003	\$0.002
Savings if GDF no longer has 15 alarms per year:		
Savings per year for GDF owner	\$11,700	\$11,700
Potential passed-through savings per gallon for customer	\$0.001	\$0.008
Savings if GDF no longer has 22 alarms per year:		
Savings per year for GDF owner	\$17,160	\$17,160
Potential passed-through savings per gallon for customer	\$0.002	\$0.011

[a] Per CARB’s multi-year survey of about 300 retail GDFs throughout California, about 80 percent of statewide GDFs experienced at least one overpressure alarm during the last three years, and about 68 percent averaged one or more overpressure alarms per year. About 48 percent of statewide GDFs experienced an average of 4 or more alarms per year during the last three years, about 27 percent experienced 10 or more alarms, about 8 percent experienced 15 or more alarms, and 36 alarms per year was the maximum observed. Alarms frequencies are expected to decrease for assist GDFs as they install EOR nozzles. CARB staff estimates that, if EOR nozzles were installed at all assist GDFs, about 39 percent of statewide GDFs would experience an average of 4 or more alarms per year during the last 3 years, about 8 percent would experience 10 or more alarms, about 2 percent would experience 15 or more alarms, and about 22 alarms per year would be the maximum observed [CARB, 2020n].

[b] Cost-savings per year for GDF owner under proposed amendments: = # of alarm responses eliminated by updated ISD software x \$780 cost per response.

[c] Savings per gallon estimates incorporate an 11% mark-up. CARB staff estimated potential retail GDF mark-up using this equation: = Profit margin ÷ (1 - Profit margin) = 9.9% ÷ (1 - 9.9%) = 11%. This calculation assumes retail GDF owners fully pass on cost-savings and change gasoline prices to maintain a constant profit margin. The profit margin of 9.9% is based on the average of gross profit margins for two sectors, 'Gasoline Stations with Convenience Stores' (NAICS code 447110) [Bizminer, 2020a] and 'Other Gasoline Stations' (NAICS code 447190) [Bizminer, 2020b]. CARB staff used this equation to estimate savings per gallon retail customers: (Savings per year for GDF owner x 1.11) ÷ (gallons of gasoline dispensed per month x 12 months).

Table L-25: Potential average statewide cost-savings for retail customers if GDF owners were to fully pass-on cost-savings under the proposed amendments, in the absence of Advisory 405

Description	Scenario A: Savings from only GDFs Required to Install ISD Software	Scenario B: Savings from Required and Voluntary Installations
Predicted gallons of gasoline dispensed in 2030 by all retail GDFs, not just those that install updated ISD software [CARB, 2020e]	11,788,121,123	11,788,121,123
Total estimated annual net savings in 2030 resulting from installation of updated ISD software that eliminates overpressure alarm response costs (from Tables 48a and 48b)	(\$7,955,340)	(\$21,408,364)
Average statewide savings per gallon	(\$0.0007)	(\$0.002)

Alternative 1 – No Action

Alternative 1 is the ‘no action’ alternative, characterized by business as usual (BAU, economic baseline under current regulation) in the absence of any amendments. Under Alternative 1, ISD overpressure alarm criteria would remain as they are in the certification and test procedures. If the Board does not amend the current ISD software specifications in certification procedure CP-201, ISD manufacturers cannot modify the ISD software to remove overpressure alarms and GDFs would continue to experience ISD overpressure alarms and incur response costs.

As illustrated in Table L-48b in section I, Alternative 1 could have up to about **\$108.9 million** in ISD overpressure alarm response costs through 2030 that could be alleviated under the proposed amendments, in the absence of Advisory 405. Small businesses could be burdened by about 63 percent (**\$69.0 million**, Table L-54) of those alarm response costs under BAU.

Alternative 2 – ISD informational reports with pressure driven emission rates

Alternative 2 would require ISD manufacturers to replace the current ISD overpressure alarm criteria with an informational report that provides site-specific pressure driven emission rates, instead of including an informational report with pressure data summaries, as would be required by the proposed amendments. Like the proposed amendments, Alternative 2 would require new GDFs and existing GDFs with major modifications to install updated ISD software, and would allow other existing GDFs to install updated ISD software on a voluntary basis. However, under Alternative 2, GDFs that install the updated ISD software also would need to install a zero-leak pressure vacuum (P/V Zero) vent valve to enable calculation of site-

specific pressure driven emission rates. Installation of a P/V Zero vent valve allows calculation of vented volume to atmosphere (vent line) emissions, once the positive pressure in the UST headspace reaches the positive cracking pressure set point, based on pressure and ullage data generated by ISD sensors. There are two other vent valves certified by CARB but they do not allow for the vent line calculation.

ISD reports with site-specific emission rates would provide a more direct method of identifying certain sites with elevated pressure driven emissions than the pressure summaries required by the proposed amendments. However, this alternative would require more complex ISD algorithms that would likely require several more years for field studies and engineering time to develop and for certification testing at multiple sites and, according to the ISD manufacturers, would result in a higher cost for the software update (Table L-13). Also, Alternative 2 would have higher start-up costs for GDF owners and operators than the proposed amendments because of the higher cost of the updated ISD software and the cost to purchase and install a P/V Zero vent valve (Table L-13). CARB monitoring conducted in 2013, 2015, and 2018 indicates only about four percent of GDFs with ISD systems currently have P/V Zero vent valves installed [CARB, 2020b]. This means most existing GDFs that would install the updated ISD software also would need to install the P/V Zero vent valve for an additional cost.

The higher costs would be borne by many GDF owners/operators required to install the more expensive software and P/V Zero valve at the time of new GDF construction or major modification of existing GDFs, and would be an increased cost burden for those businesses that own GDFs that would not have experienced overpressure alarms. Also, CARB staff estimated that about 600 fewer GDFs may find it cost effective to voluntarily install the updated ISD software under Alternative 2 compared to the proposed amendments (Table L-68). Using the methods described in the earlier 'Proposed Amendments' section and the values in Tables L-13 and Tables L-26 through L-31, CARB's staff estimated the potential direct costs under Alternative 2. As illustrated in Table L-68, Alternative 2 could have up to about **\$5.3 million** in additional ISD overpressure alarm response costs through 2030 for small GDF businesses, compared to the proposed amendments.

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Table L-26: Estimation of 'break-even' threshold under Alternative 2 for business-owned GDFs assumed to voluntarily install updated ISD software based on cost-effectiveness

Description	Result
Estimated statewide average cost per GDF to install updated ISD software and P/V Zero valve <i>[described on next page]</i> = Permit fees + Software Cost + Installation Cost + loan interest (a) Divided by 5 years minus \$97 for annual maintenance savings:* (b) Divided by 15 years minus \$97 for annual maintenance savings:*	\$9,331.38 \$1,769 \$525
Estimated cost to GDF owner per ISD overpressure alarm response <i>[described in next bulleted subsection]</i> = GDF owner time + Service contractor response cost	\$780 per response
<p>Estimated 'break even' thresholds:</p> <p>Minimum number of ISD overpressure alarm responses per year to be cost-effective to install updated ISD software and P/V Zero valve if cost-effectiveness is based on:</p> <p>(a) Break-even threshold assumed for small business-owned GDFs:^ = \$1,769/year ISD software cost annualized over 5 years ÷ \$780 per response</p> <p>(b) Break-even threshold assumed for hypermarkets and large business-owned GDFs:^ = \$525/year ISD software cost annualized over 15 years ÷ \$780 per response</p>	

* Values rounded to nearest whole dollar.

^ Values rounded up to one significant digit; 0.7 alarm per year equates to about 2 alarms every three years.

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Table L-27: Estimation of number of business-owned retail GDFs that may voluntarily install updated ISD software based on cost-effectiveness under Alternative 2

DESCRIPTION	ASSIST GDFs			BALANCE GDFs			TOTAL
	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	
EXISTING GDFs: ^[a]							
# of existing retail GDFs in California [from Table L-2]	2,181	217	1,168	2,666	158	1,428	7,818
Break-even threshold (ISD overpressure alarms per year) [from Table L-26]	3	0.7	0.7	3	0.7	0.7	---
% of GDFs with OP alarm frequency \geq the break-even threshold during the last 3 years, based on statewide survey [CARB, 2020b, Appendix III; CARB, 2020n]	70%	93%	90%	17%	93%	43%	---
Total # of existing retail GDFs predicted to voluntarily install updated ISD software and P/V Zero valve = % of GDFs with alarm frequency \geq break-even threshold x # of existing retail GDFs	1,527	202	1,051	453	147	614	---
# of existing retail GDFs estimated to be <u>required</u> to install updated ISD software [from Table L-9]	174	156	841	213	114	1,028	2,526
# of existing retail GDFs estimated to be <u>required</u> to install updated ISD software that have OP alarm frequency \geq the break-even threshold = % of GDFs with alarm frequency \geq break-even threshold x # of existing retail GDFs required to install updated software	122	145	757	36	106	442	---
Total # of existing retail GDFs predicted to voluntarily install updated ISD software adjusted to account for GDFs required to install updated software = Total # of voluntary installations <u>minus</u> # of required installations at GDFs with alarm frequency \geq the break-even threshold	1,405	57	294	417	41	172	2,386
NEW GDFs constructed between 2021 and 2022:							
# of new retail GDFs predicted to be constructed over next 10 years [from Table L-3]	199	20	107	244	14	131	715
# of new retail GDFs predicted to be constructed between 2021 and 2022 = # of new GDFs x 0.2	40	4	21	49	3	26	143
# of new retail GDFs constructed between 2021 and 2022 predicted to <u>voluntarily</u> install updated ISD software = # of new 2021-2022 GDFs x % of GDFs with alarm frequency \geq break-even threshold	28	4	19	8	3	11	73

Table L-28: Assumed timing of updated ISD software installations at business-owned GDFs under Alternative 2

Category		2023	2024	2025	2026	2027	2028	2029	2030
Estimated number of GDFs <u>required</u> to install updated ISD software:									
Existing GDFs:	Small CA Business	49	49	49	48	48	48	48	48
	Other Businesses ^[a]	268	268	268	267	267	267	267	267
New GDFs:	Small CA Business	45	45	44	44	44	44	44	44
	Other Businesses ^[a]	28	28	27	27	27	27	27	27
Estimated maximum number of GDFs that may <u>voluntarily</u> install updated ISD software:									
Existing GDFs:	Small CA Business	456	456	456	456	0	0	0	0
	Other Businesses ^[a]	141	141	141	141	0	0	0	0
New GDFs:	Small CA Business	9	9	9	9	0	0	0	0
	Other Businesses ^[a]	10	9	9	9	0	0	0	0

[a] Approximately 58 percent of 'other businesses' are based in California.

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Table L-29: Average annual ISD overpressure alarm response costs per business-owned GDF for GDFs predicted to install updated software under Alternative 2

DESCRIPTION	ASSIST GDFs			BALANCE GDFs		
	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses
Estimated values for GDFs <u>required</u> to install updated ISD software:						
Average annual number of ISD overpressure alarms per GDF for all GDFs that experience alarms	6	8.3	6	2.3	8.3	2.3
Average annual alarm response costs per GDF estimated for all GDFs that experience alarms ^[a]	\$4,680	\$6,474	\$4,680	\$1,794	\$6,474	\$1,794
		\$4,973 ^[b]			\$2,553 ^[b]	
# of existing GDFs predicted to replace ISD consoles during 2023-2030 and to respond to ISD OP alarms under BAU	165	156	799	121	114	586
# of new GDFs predicted to be constructed during 2023-2030 and to respond to ISD OP alarms under BAU	151	16	82	111	11	60
Estimated values for GDFs that <u>voluntarily</u> install updated ISD software under Alternative 2:						
Average annual number of ISD overpressure alarms per GDF for GDFs predicted to voluntarily install updated ISD software	7.6	8.8	6.4	5.6	8.8	2.9
Average annual alarm response costs per GDF for GDFs predicted to voluntarily install updated ISD software ^[a]	\$5,928	\$6,864	\$4,992	\$4,368	\$6,864	\$2,262
		\$5,294 ^[b]			\$3,104 ^[b]	
Maximum number of existing GDFs predicted to voluntarily install updated ISD software during between 2023 and 2026	1,406	57	294	418	41	172
Maximum number of new GDFs predicted to be constructed during 2021-2022 and to voluntarily install update ISD software between 2023 and 2026	28	4	19	8	3	11

[a] Average annual ISD overpressure alarm response costs per GDF are estimated by multiplying the average annual alarm frequency for each category by \$780, the estimated cost to a GDF owner per alarm response.

[b] Weighted average annual alarm response costs per GDF for hypermarkets and other business-owned GDFs (not including small business-owned GDFs) that experience alarms used to estimate statewide costs for GDFs that are not owned by small businesses.

Table L-30: Assumed number of existing and new business-owned GDFs that respond to alarms under BAU each year and are predicted to install updated ISD software under Alternative 2 ^[a]

Category		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Estimated number of GDFs that have ISD overpressure alarms under BAU and could be <u>required</u> to install updated ISD software under Alternative 2: ^[b, c]											
Assist:	Small CA Business	165	165	165	184	203	222	241	260	279	297
	Other Businesses	955	955	955	968	980	992	1004	1016	1028	1040
Balance:	Small CA Business	121	121	121	135	149	163	177	191	205	218
	Other Businesses	700	700	700	709	718	727	736	745	754	762
Estimated maximum number of GDFs that have ISD overpressure alarms under BAU and are predicted to <u>voluntarily</u> install updated ISD software under Alternative 2 to reduce operating costs: ^[c]											
Assist:	Small CA Business	1406	1420	1434	1434	1434	1434	1434	1434	1434	1434
	Other Businesses	351	363	374	374	374	374	374	374	374	374
Balance:	Small CA Business	418	422	426	426	426	426	426	426	426	426
	Other Businesses	213	220	227	227	227	227	227	227	227	227

- [a] These values are used to estimate response costs under BAU for comparison to response costs under the proposed amendments. To simplify calculations, CARB staff assumed construction of all new GDFs is completed in December of each year and therefore response costs would not begin until the following year.
- [b] The estimated number of GDFs required to install updated ISD software begins to increase in 2023 because once the updated ISD software under the proposed amendments has been certified by CARB (anticipated by December 2022), new GDFs would be required to install ISD systems with the updated software at the time of construction.
- [c] The same number of GDFs would be required to install updated ISD software under Alternative 2 as under the proposed amendments.
- [d] The estimated maximum number of GDFs that voluntarily installs updated ISD software increases as new GDFs are constructed until 2023 based on the assumption that new GDFs constructed in 2021 and 2022 will have the same distribution of ISD overpressure alarm frequencies as existing GDFs. The number stops increasing in 2023 because, once the updated ISD software under the proposed amendments has been certified by CARB (anticipated by December 2022), new GDFs constructed in 2023 onward would be required to install ISD systems with the updated software at the time of construction and would not experience any overpressure alarms nor associated alarm response costs.

Table L-31: Assumed number of GDFs under Alternative 2 that respond to ISD overpressure alarms until they install updated ISD software

Category		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Estimated number of GDFs <u>required</u> to install updated ISD software under the proposed amendments that have overpressure alarms until they install the updated software: ^[a, b]											
Assist:	Small CA Business	165	165	165	144	123	102	81	60	39	18
	Other Businesses	955	955	955	836	717	598	479	360	241	122
Balance:	Small CA Business	121	121	121	106	91	76	61	46	31	16
	Other Businesses	700	700	700	612	524	436	348	260	172	84
Estimated maximum number of GDFs predicted to <u>voluntarily</u> install updated ISD software and have overpressure alarms until they install the updated software: ^[a]											
Assist:	Small CA Business	1406	1420	1434	1075	716	357	0	0	0	0
	Other Businesses	351	363	374	280	186	92	0	0	0	0
Balance:	Small CA Business	418	422	426	319	212	105	0	0	0	0
	Other Businesses	213	220	227	170	113	56	0	0	0	0

- [a] To simplify calculations, CARB staff assumed GDFs complete installation of updated ISD software in December of each year (from 2023 onward, assuming CARB certifies updated software by December 2022) and therefore response costs would cease at the beginning of the following year.
- [b] New GDFs required to install updated ISD software at the time of construction once the software is certified by CARB (anticipated by December 2022) are not included in these counts because, under the proposed amendments, they would never experience any ISD overpressure alarms nor associated alarm response costs.

Alternative 3 – Require all new and existing GDFs to install updated ISD software

Alternative 3 would require all new and existing GDFs to install updated ISD software within four years of CARB certification of updated software. In comparison, the proposed amendments would require only new GDFs and existing GDFs with major modifications to install the updated ISD software; all other existing GDFs could continue to use the already-installed software until the end of its useful life. Alternative 3 has the same informational pressure summary report and pressure data storage requirements for ISD software as the proposed amendments.

There would be no cost difference between the proposed amendments and Alternative 3 for the following:

- Certification of updated ISD software:
 - ISD manufacturers required to make changes to their software the next time they seek certification renewal; and
 - CARB and other state and local agencies that participate in the certification process.

- Installation of updated ISD software:
 - Business- and government-owned GDFs with ISD that are required to install updated ISD software at the time of new GDF construction or major modification of existing GDFs that occur during 2023 through 2026 (Table L-9).

Direct costs under Alternative 3 differ from the proposed amendments for the following:

- Installation of updated ISD software:
 - Existing business- and government-owned GDFs with ISD that have major modifications during 2027-2030 would be required to install updated ISD software under the proposed amendments with an additional cost of about \$23 per GDF compared to BAU. Alternative 3 would require these GDFs to install updated ISD software one or more years earlier in a separate action from the major modification, which would result in a greater cost, \$3,570 compared to \$23 per GDF.
 - Business- and government-owned GDFs with ISD that do not have major modifications and experience zero ISD overpressure alarms, or experience overpressure alarms so infrequently that it would not be cost-effective for them to install the updated ISD software, are not expected to install updated ISD software under the proposed amendments. Alternative 3 would require these GDFs to install updated ISD software, which would cost about \$3,570 per GDF.
 - Local agencies (Air Districts and CUPAs) that issue permits to GDF owners for updated ISD software installation would have greater permitting costs under Alternative 3 compared to the proposed amendments.

Local agencies own only about four GDFs with ISD so the cost difference for local agencies between Alternative 3 and the proposed amendments is not substantial on a statewide basis. In addition, additional Air District and CUPA permitting costs are fully recovered from GDF owners because these agencies have legal authority to recover related costs by imposing fees.

CARB staff used the information and assumptions listed in Table L-32 and methods described in the earlier “Proposed Amendments” section to estimate the statewide cost difference for business-owned GDFs under Alternative 3 compared to the proposed amendments through 2030.

As described in Table L-33, the cost difference for business-owned GDFs could be substantial—about \$12.9 million through 2030—on a statewide basis, with about \$8 million (63 percent) borne by small businesses. In addition, business owners with GDFs that do not experience ISD overpressure alarms could have costs of about \$4.9 million, without any associated cost-savings from foregone alarm response costs.

Table L-32: Estimation of additional GDFs required to install updated ISD software under Alternative 3 compared to proposed amendments

DESCRIPTION	ASSIST GDFs			BALANCE GDFs			TOTAL
	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	
ISD overpressure alarm frequencies [CARB, 2020b, Appendix III; CARB, 2020n]							
(a) Percent of GDFs that had zero ISD overpressure alarms during the prior 3 years	5%	0%	5%	43%	0%	43%	---
(b) Percent of GDFs with 3-year average annual OP alarm frequency \geq the break-even cost-effectiveness threshold for voluntarily installing updated ISD software [see Table L-11]	86%	93%	90%	29%	93%	43%	---
(c) Percent of GDFs with 3-year average annual OP alarm frequency $<$ the break-even threshold	9%	7%	5%	28%	7%	14%	---
EXISTING GDFs:							
(d) # of existing GDFs in California [from Table L-2]	2,182	217	1,168	2,667	158	1,428	7,820
(e) # of existing GDFs estimated to be required to install updated ISD software under the proposed amendments [from Table L-9]	174	156	841	213	114	1,028	2,526
(f) # of existing GDFs estimated to have major modifications during 2023-2026 [from Tables L-9 and L-12]; these would not have additional costs under Alternative 3 compared to the proposed amendments	87	78	421	108	57	515	1,266
(g) # of existing GDFs estimated to have major modifications during 2027-2030 [from Tables L-9 and L-12]; these would be required to install updated ISD software one or more years earlier, and at a greater cost (\$3,091 compared to \$20), under Alternative 3 compared to the proposed amendments	87	78	420	105	57	513	1,260
(h) Difference between (d) and (e)	2,008	61	327	2,454	44	400	5,294
(i) Estimated number of GDFs that do not experience ISD overpressure alarms that would be required to install updated ISD software under Alternative 3 but not under the proposed amendments = (h) x (a)	100	0	16	1,055	0	172	1,343
(j) Difference between (h) and (i)	1,908	61	311	1,399	44	228	3,951

DESCRIPTION	ASSIST GDFs			BALANCE GDFs			TOTAL
	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	GDFs Owned by Small Businesses	Hyper-markets	GDFs Owned by Other Businesses	
(k) Total # of existing GDFs predicted to voluntarily install updated ISD software adjusted to account for GDFs required to install updated software [from Table L-11]	1,727	57	294	712	41	172	3,003
(l) Estimated number of GDFs that experience ISD overpressure alarms infrequently and would be required to install updated ISD software under Alternative 3 but not under the proposed amendments = (j) - (k)	181	4	17	687	3	56	948
NEW GDFs:							
(m) # of new retail GDFs predicted to be built in California during 2021-2022 [before updated ISD software is available, based on Tables L-11 and L-12]	40	4	21	49	3	26	143
(n) Estimated number of new GDFs expected to not experience ISD overpressure alarms that would be required to install updated ISD software under Alternative 3 but not under the proposed amendments = (a) x (m)	2	0	1	21	0	11	35
(o) Estimated number of new GDFs predicted to voluntarily install updated ISD software adjusted to account for GDFs required to install updated software [from Table L-11] = (b) x (m)	34	4	19	14	3	11	85
(p) Estimated number of new GDFs that experience ISD overpressure alarms infrequently and would be required to install updated ISD software under Alternative 3 but not under the proposed amendments	4	0	1	14	0	4	23

Table L-33: Additional costs estimated under Alternative 3 compared to proposed amendments to install updated ISD software

Description	Cost per GDF	# of Existing and New GDFs			Total Additional Cost		
		Small Business	Other Business	TOTAL	Small Business	Other Business	TOTAL
Estimated costs for GDFs required to install updated ISD software one or more years earlier, and at a greater cost (\$3,570 compared to \$23, including loan interest), under Alternative 3 compared to the proposed amendments [# of GDFs summed from Table L-32, row (g)]	\$3,547	192	1,068	1,260	\$681,024	\$3,788,196	\$4,469,220
GDFs that do not experience ISD overpressure alarms that would be required to install updated ISD software under Alternative 3 but not under the proposed amendments [from Table L-32, rows (i) and (n)]	\$3,570	1,178	200	1,378	\$4,205,710	\$714,821	\$4,920,531
Estimated number of GDFs that experience ISD overpressure alarms infrequently and would be required to install updated ISD software under Alternative 3 but not under the proposed amendments [from Table L-32, rows (l) and (p)]	\$3,570	886	85	971	\$3,162,770	\$302,629	\$3,465,399
TOTAL:		2,256	1,353	3,609	\$8,049,504	\$4,805,646	\$12,855,150

Alternative 4 – Require all new and existing GDFs to install high capacity vapor processors

CARB staff evaluated the costs of an alternative proposed by stakeholders to require all existing and new GDFs with ISD—about 8,545 GDFs by 2030—to install high capacity vapor processors (HCVP), rather than ISD software updates, as a means of eliminating the occurrence of the ineffective ISD overpressure alarms.

Some GDFs have already installed HCVPs even though CARB and Air District regulations did not require HCVP installation. CARB staff discussions with owners/operators of the largest hypermarkets indicate there are additional factors besides cost-effectiveness that affect their decision to install HCVPs, including environmental considerations. Because there are no CARB or Air District regulations that require the installation of HCVPs, the existing and potential HCVP installations are not considered as part of regulatory baseline (business as usual) for this cost evaluation.

Using the methods described in the earlier ‘Proposed Amendments’ section and the information in Tables L-34 through L-41, CARB staff estimated the potential initial costs under Alternative 4 for business-owned GDFs. One-time costs to purchase and install an HCVP can range from about \$32,000 to \$101,000 per GDF for equipment, installation, and permitting fees. The costs vary based on the type of vapor recovery system and location of the GDF because permit fees vary by CUPA and Air District. Also, as summarized in Table L-41, annual maintenance and operational costs can range from a net positive savings due to fuel savings for some GDFs with very high gasoline throughput, to net costs higher than \$600 per year for many GDFs.

CARB staff estimated that Alternative 4 could have initial costs that are about \$530 million greater than the proposed amendments (Table L-42) for business-owned GDFs. These include additional costs of about \$80 million for nearly 2,100 GDFs that may not experience any ISD overpressure alarms (Table L-43). Requiring these existing GDFs to install HCVPs would result in a cost burden with no reduction in emissions and no cost savings for the GDF owner/operators (from foregone alarm response costs), and they could incur ongoing maintenance and operational costs that can range from about \$200 to higher than \$600 per year.

As noted in Chapter IX, CARB staff rejected Alternative 4 because of the economic burden it would place on GDFs, many of which are owned by small businesses.

Table L-34: Estimation of cost per GDF for business owners to research processor options

Description	Retail GDFs Owned by Small Businesses	Hypermarkets & Retail GDFs Owned by Other Businesses
GDF owner/operator cost per hour ^[a]	\$62	\$62
Time needed for GDF owner/operator to research contractor and processor options and provide information for permits and contractors.	8	4
Cost for GDF owner/operator to research contractor and processor options	\$496	\$248
Contractor cost per hour to research processor options and prepare permit applications ^[b]	\$120	\$120
Contractor hours per GDF to research processor options and prepare Air District and other agencies' permit applications	15	10
Cost for consultant for permitting and research	\$1,800	\$1,200
TOTAL COST TO RESEARCH PROCESSOR OPTIONS	\$2,296	\$1,448

[a] Assumes economy of scale (lower costs per instance) for businesses that may complete this action for multiple GDFs. CARB staff assumes hypermarkets (HM) and other large and mid-sized businesses that own many GDFs would need less time per GDF for research and permitting consultant time due to installations at multiple sites.

[b] CARB staff estimates an average hourly rate for contracted engineers of \$120 based on: mean hourly wage for a mechanical engineer in May 2018 in California was \$51.62 [USBLS, 2019a], and wages for private industry 'manufacturing' as a percent of total compensation in 2019 was 65.7% [USBLS, 2019b]. CARB staff used these equation to estimate hourly rate: = $\$51.62 \div 65.7\% = \$78.57 = \$80$ (rounded to one significant digit); and to account for all overhead costs: = $\$80 + (\$80 \times 50\%) = \$120/\text{hour}$.

Table L-35: Estimation of permitting costs for per existing GDF owned by business

Description	Value
Air District permit fee ^[a]	\$1,235
Average Air District engineer hourly rate ^[b]	\$125
Processing time needed (hours per permit) ^[c]	4
Cost of Air District engineer hourly time = Hourly rate x Processing time needed	\$500
Air District costs per GDF HCVP installation = permit fees + cost of billable engineer time	\$1,735
CUPA permit fee^[d]	\$580
TOTAL PERMITTING COSTS:	\$2,315

- [a] Air District permit fees have a substantial range. The permit costs for installing a high capacity vapor processor for the 11 Air Districts that responded to CARB's 2020 survey [CARB, 2020a] range from \$87 to \$2,368, averaging \$929 if the South Coast permit fee is included, and \$827 if it is excluded. For comparison, the 5 Districts with ~80% of GDFs in California have the same range [\$87, \$889, \$993, \$1,848.29, and \$2,368], averaging ~\$1,240 if the South Coast permit fee is included, and ~\$1,525 if it is excluded. South Coast permit fee is \$1848.29. In 2018 the South Coast encompassed ~37% of retail GDFs in California, and ~44% of statewide gasoline sales [CARB, 2020d, Table 9], and CARB's 2020 survey of Air Districts [CARB, 2020a] indicates the South Coast encompasses ~41% of GDFs with ISD systems, so CARB staff uses 40% for weighting statewide cost estimates. CARB staff used the following equation to estimate statewide average Air District permit fees, weighted to account that ~40% of GDFs are in the South Coast:
= (0.4*\$1848.20) + (0.6 * \$827) = \$1,235.
- [b] Engineer hourly processing rates for the 5 Air Districts that provided rates for CARB's 2020 survey range from \$42 to \$219, averaging \$125 [CARB, 2020a]. [South Coast did not provide a rate.]
- [c] Based on 2020 survey responses for a variety of permitting actions [CARB, 2020a], CARB staff assumes a typical HCVP permit requires 4 hours to process.
- [d] Of the 12 CUPAs that responded to the CARB 2020 survey question about permits for processor installation, 4 require permits for installation of a processor (\$800 to a maximum of \$2,849 [3 USTs], average \$1,623) and 1 requires a permit only if the installation involves subsurface excavation/piping (\$468) [CARB, 2020]. Average permit fee for the 5 CUPAs that require permits is \$1,392; if zero values are included for those CUPAs that do not require a permit, the average permit fee is \$580. Because the intent of this analysis is to assess average statewide costs, \$580 is used to estimate statewide CUPA fees. None of the CUPAs reported an hourly processing fee for permits for processor installation.

Table L-36: Estimated HCVP equipment and installation costs for per GDF owned by businesses

DESCRIPTION	ASSIST: GDFs Owned by Small Businesses	ASSIST: Hyper- markets and GDFs Owned by Other Businesses	BALANCE: GDFs Owned by Small Businesses	BALANCE: Hyper- markets and GDFs Owned by Other Businesses
Capital cost for high capacity vapor processor ^[a]	\$45,000	\$50,000	\$13,500	\$15,000
Capital cost for high capacity vapor processor including hypothetical manufacturer discounts ^[b]	\$25,000	\$25,000	\$3,500	\$3,500
Installation cost for high capacity vapor processor ^[c]	\$37,500	\$33,750	\$9,800	\$8,820
Installation cost for high capacity vapor processor including cost to research processor options [used to estimate statewide average costs]	\$40,246	\$35,498	\$12,546	\$10,568

[a] Assist processor cost estimate provided by manufacturer; assist processor manufacturer assumed a 10% quantity discount for relatively smaller GDFs (i.e., not hypermarkets) to reflect cost savings from component suppliers passed on to the end user. Balance processor cost estimate based on average (rounded to two significant figures) of quotes from the manufacturer (\$14,818.50) and four distributors (\$13,995 to \$15,785); per balance processor manufacturer, distributors typically discount 15% to \$12,595. For these calculations, CARB staff assumed a 10% discount for both assist and balance processors for retail GDFs owned by small businesses, and no discount for hypermarkets and large and mid-sized businesses.

[b] One of the two currently certified HCVP manufacturers informed CARB staff that if all GDFs with ISD were required to install HCVPs, the equipment purchase cost could be substantially reduced, e.g., from about \$15,000 to \$3,500 for the balance model. For comparison, CARB staff assumed the assist model cost would also be substantially reduced.

[c] Assist processor installation cost estimate provided by manufacturer as a range, \$25,000 to \$50,000; midpoint of range used for these calculations. Balance processor installation cost estimate is based on the average of five values. In November 2018, the balance processor manufacturer, provided estimates for installation at GDFs with aboveground storage tanks with (\$6,000 [\$6,145 in March 2020 dollars]) and without (\$12,000 to \$14,000) an existing liquid condensate trap (LCT) and plumbing along the below-grade vapor return line to return liquid condensate to the storage tank. In April 2020, the manufacturer said installation costs had not changed significantly since 2018, and recommended using the quotes for GDFs already with an existing LCT because LCTs are almost never needed for GDFs with USTs. Three service contractor quotes in 2017 (adjusted for inflation and to remove LCT installation cost) and one in 2020 range from \$6,000 to \$14,880. These estimates assume an economy of scale (lower costs per instance) for larger businesses that may install high capacity processors at multiple GDFs. CARB staff assumes hypermarkets and large and mid-sized businesses that own many GDFs would have installation discount of 10% due to installations at multiple sites.

Table L-37: Estimation of ongoing annual savings per assist GDF that installs an HCVP from less fuel lost to emissions due to installation of high capacity processor that circulates retentate to UST – Method 1 – Based on pressure driven emission factors calculated at CARB long-term study sites with assist systems[^]

Description	Hypermarkets	Retail GDFs owned by Large and Small Businesses
Statewide, annualized average pressure driven emission factor (PDEF, lbs/kgal) for all GDFs ^[a]	0.14	0.14
Emissions captured by assist HCVP (ER _{HCVP} , lbs/kgal) and returned to UST as liquid ^[b] = Average PDEF x 95%	0.133	0.133
Average gasoline throughput per month per GDF (gallons) [CEC, 2019]	970,000	140,000
Average annual pressure driven emissions reduced per GDF by HC vapor processor (lbs/year) = ER _{HCVP} x Average monthly throughput ÷ 1,000 x 12	1,548	223
Method 1 annual savings per GDF^[c] = Emission Reduction (pounds) ÷ 6.3 (conversion factor) x Gasoline value (\$4.42/gallon)	\$1,100[^]	\$160

[^] CARB staff evaluated potential fuel savings for assist GDFs that install an HCVP using multiple methods and selected the higher (more optimistic) fuel savings estimate for each category of assist GDFs to assess the potential best-case statewide scenario for HCVP costs. For statewide cost estimates, CARB staff uses the average estimated annual fuel savings of \$1,100 per hypermarket (from Table L-37) and \$239 per moderate throughput GDF (from Table L-38, Method 2 Part B).

[a] CARB staff used the statewide, annualized average PDEF for 2018 [CARB, 2020d and 2020e] in this calculation for both hypermarkets and smaller GDFs because site-specific PDEFs do not correlate with throughput (e.g., the study sites with the highest PDE rates do not exhibit the highest throughputs).

[b] CARB staff assumed a pressure driven emissions control efficiency of 95% in order to calculate the fuel savings for high capacity processors. CARB staff used engineering judgment and information submitted by the processor manufacturer along with pressure data from sites operating with and without high capacity processors to select the value of 95%. The control efficiency at individual GDFs may be different due to variations in GDF operating characteristics and HCVP type.

[c] Gasoline value: Average of 2021-2030 annual averages of Low, Mid, and High Demand Case gasoline prices for California [CEC, 2018, Figure 4-16], adjusted for inflation from 2015 to 2020 dollars as of March 2020 using the U.S. Bureau of Labor Statistics CPI Inflation Calculator, accessed on April 28, 2020, at: https://data.bls.gov/data/inflation_calculator.htm.

Table L-38: Estimation of ongoing annual savings per assist GDF that installs an HCVP from less fuel lost to emissions due to installation of high capacity processor that circulates retentate to UST – Method 2 – Based on sample calculation in processor Installation, Operation and Maintenance (IOM) Manual, and CARB staff field observations for two hypermarkets with ~1 million gallons per month throughput[^]

Table L-38 - Part A: Method 2 assumptions for and calculation of gallons of gasoline saved by an HCVP at a HYPERMARKET assist GDF

Description	Winter	Summer
Average vapor production rate due to evaporation (gallons per hour) ^[a]	140	50
Hours per day that processor is running ^[b]	7.2	2.4
Control efficiency of processor ^[c]	95%	95%
Concentration of vapors controlled (lbs/1,000 gal)	9.5	7.65
Density of liquid retentate (lbs/gal) [conversion factor for pounds per gallon of gasoline]	6.3	6.3
Number of days in winter & summer	120	245
Gallons of gasoline saved (retentate) <u>Winter</u> = 140 gal vapor/hour x 7.2 hr/day x 95% x 9.5 lbs ÷ 1000 gal vapor x 1 gal liquid ÷ 6.3 lb x 120 days/winter = 173 gallons <u>Summer</u> = 50 gal vapor/hour x 2.4 hr/day x 95% x 7.65 lbs ÷ 1000 gal vapor * 1 gal liquid ÷ 6.3 lb x 245 days/winter = 34 gallons	173	34
Method 2 annual savings per <u>HYPERMARKET</u> = Gallons of gasoline saved (winter + summer) x Gasoline value (\$/gallon)		\$915

[^] CARB staff evaluated potential fuel savings for assist GDFs that install an HCVP using multiple methods and selected the higher (more optimistic) fuel savings estimate for each category of assist GDFs to assess the potential best-case statewide scenario for HCVP costs. For statewide cost estimates, CARB staff uses the average estimated annual fuel savings of \$1,100 per hypermarket (from Table L-37) and \$239 per moderate throughput GDF (from Table L-38, Method 2 Part B).

[a] Evaporation rates are based on two hypermarket GDFs during periods when the ullage was constant and the pressure was near zero (-0.3 to +0.3 "WCG) and rising. Lower throughput sites and those open 24/7 have lower evaporation rates and will recover less product.

[b] Assist processor winter value based on CARB staff field observations and calculations for two hypermarkets that indicate the processors run 2 to 6 hours per night, which is comparable to but less than the ARID IOM assumption of 7.2 hours per day at 30% duty cycle. To provide an optimistic estimate, staff uses 7.2 hours for these cost estimates. Assist processor summer value assumes processor operates a third as much of the time as during the winter, based on the ratio of the vapor production rates for summer and winter.

[c] CARB staff assumed a pressure driven emissions control efficiency of 95% in order to calculate the fuel savings for high capacity processors. CARB staff used engineering judgment and information submitted by the processor manufacturer along with pressure data from sites operating with and without high capacity processors to select the value of 95%. The control efficiency at individual GDFs may be different due to variations in GDF operating characteristics and HCVP type.

Table L-38 - Part B: Method 2 assumptions for and calculation of gallons of gasoline saved by an HCVP at a MODERATE throughput assist GDF[^]

Description	Winter	Summer
Average vapor production rate due to evaporation (gal/hour) ^[a]	90	30
Hours per day that processor is running ^[b]	3	1
Control efficiency of processor ^[c]	95%	95%
Concentration of vapors controlled (lbs/1,000 gal)	9.5	7.65
Density of liquid retentate (lbs/gal) [conversion factor for pounds per gallon of gasoline]	6.3	6.3
Number of days in winter & summer	120	245
Gallons of gasoline saved (retentate)		
$\text{Winter} = 90 \text{ gal vapor/hour} \times 3 \text{ hr/day} \times 95\% \times 9.5 \text{ lbs} \div 1000 \text{ gal vapor} \times 1 \text{ gal liquid} \div 6.3 \text{ lb} \times 120 \text{ days/winter} = 46 \text{ gallons}$	46	8
$\text{Summer} = 30 \text{ gal vapor/hour} \times 1 \text{ hr/day} \times 95\% \times 7.65 \text{ lbs} \div 1000 \text{ gal vapor} \times 1 \text{ gal liquid} \div 6.3 \text{ lb} \times 245 \text{ days/winter} = 8 \text{ gallons}$		
Method 2 annual savings per MODERATE throughput GDF value (\$/gallon)	\$239[^]	

[^] CARB staff evaluated potential fuel savings for assist GDFs that install an HCVP using multiple methods and selected the higher (more optimistic) fuel savings estimate for each category of assist GDFs to assess the potential best-case statewide scenario for HCVP costs. For statewide cost estimates, CARB staff uses the average estimated annual fuel savings of \$1,100 per hypermarket (from Table L-37) and \$239 per moderate throughput GDF (from Table L-38, Method 2 Part B).

[a] Evaporation rates are based on balance sites from the December 2015 Blitz during periods when the ullage was constant and the pressure was near zero (-0.3 to +0.3 "WCG) and rising. Lower throughput sites have lower evaporation rates and will recover less product.

[b] Assist processor winter value based on CARB staff field observations and calculations for two hypermarkets that indicate the processors run 2 to 6 hours per night, which is comparable to but less than the ARID IOM assumption of 7.2 hours per day at 30% duty cycle. For moderate throughput sites that close at night the processor operating hours will be lower than for hypermarkets and sites that operate 24 hr/day may never reach the pressure that activates the processor. Staff uses a winter value of 3 hours for these cost estimates, which is likely biased high for use as a statewide average. Assist processor summer value assumes processor operates a third as much of the time as during the winter, based on the ratio of the vapor production rates for summer and winter.

[c] CARB staff assumed a pressure driven emissions control efficiency of 95% in order to calculate the fuel savings for high capacity processors. CARB staff used engineering judgment and information submitted by the processor manufacturer along with pressure data from sites operating with and without high capacity processors to select the value of 95%. The control efficiency at individual GDFs may be different due to variations in GDF operating characteristics and HCVP type.

Table L-39: Estimation of ongoing annual costs per balance GDF that installs an HCVP resulting from gasoline consumption by the HCVP

Description	Winter	Summer
Hours per day that the processor is operating ^[a]	2	0.4
Gasoline consumption per day from processor operation (gallons) ^[b]	0.25	0.05
Number of days in winter & summer	120	245
Value of fuel (per gallon) that will be lost during 2021-2030 ^[b]	\$4.42	\$4.42
Seasonal gasoline consumption cost = gallons x # of days in season x \$/gallon	\$132.60	\$54.15
Annual gasoline consumption cost per hypermarket = winter cost + summer cost [rounded to 2 significant digits]	\$190	
Annual gasoline consumption cost per non-hypermarket GDF with average throughput of 140,000 gal/month if assume costs are proportional to throughput = \$190 x 140,000 gal/mo ÷ 1,000,000 gal/mo [rounded up to the nearest dollar]	\$27	

- [a] Balance processor winter value based on assumption that 2 hours operation time is needed to control a 200 gallons per hour (gph) evaporation rate over an 8-hour overnight shutdown, if the blower moves 450 gph. Both assist and balance processor summer values assume processor operates only a fifth as much of the time as during the winter (rounded to 1 decimal place), given pressure driven emissions are currently about five times higher during the winter than the summer [CARB, 2020e and 2020f].
- [b] Balance processor value based on information provided by Hirt via email in April 2020: the processor consumes about a pint (0.125 gallon) to a quart (0.25 gallon) of gasoline per day. CARB staff assumed that a hypermarket would consume 0.25 gallon/day during the winter, and one fifth of that consumption during the summer (0.05 gallon/day), based on above assumptions for hours per day that the processor is operating.
- [c] Average of 2021-2030 annual averages of Low, Mid, and High Demand Case gasoline prices for California [CEC, 2018, Figure 4-16], adjusted for inflation from 2015 to 2020 dollars as of March 2020 using the U.S. Bureau of Labor Statistics CPI Inflation Calculator, accessed on April 28, 2020, at: https://data.bls.gov/data/inflation_calculator.htm.

Table L-40: Cost of electricity to operate an HCVP

Table L-40 - Part A: Assumptions for cost estimates for electricity usage by HCVPs at both hypermarkets and moderate throughput GDFs

DESCRIPTION	ASSIST: Winter	ASSIST: Summer	BALANCE: Winter	BALANCE: Summer
Power to operate processor (kilowatts, kW): ^[a] Assist = $(1.73 [\text{square root of } 3] \times 208 \text{ volts} \times 5.2 \text{ amps} \times 0.8 \text{ power function}) \div 1,000$ Balance = $(1.73 [\text{square root of } 3] \times 120 \text{ volts} \times 3 \text{ amps} \times 0.8 \text{ power function}) \div 1,000$	1.5	1.5	0.5	0.5
Number of days in winter & summer	120	245	120	245
Cost per kilowatt-hour (\$/kWh) ^[b]	\$0.1564	\$0.1564	\$0.1564	\$0.1564

[a] Assist processor value based on calculations and assumptions provided by the manufacturer's Installation, Operation and Maintenance (IOM) Manual for steady-state load estimated for the ARID Permeator vacuum pump's 2.0 horsepower motor that operates on 208V/3-phase/60 HZ power. Hirt processor based on information provided by Hirt via email (electrical usage is mainly the motor for the vapor pump/blower/turbine, which is 1/8 horsepower and draws 3 amperes) and IOM Manual (120 volts).

[b] Average price of electricity for 'commercial' end-use sector, year-to-date through February 2020 [EIA, 2020].

Table L-40 - Part B: Assumptions for cost estimates for electricity usage by an HCVP at a hypermarket

DESCRIPTION	ASSIST: Winter	ASSIST: Summer	BALANCE: Winter	BALANCE: Summer
Hours per day that the processor is operating ^[a]	7.2	2.4	2	0.4
Kilowatt hours per day (kWh/day): = kW x operating hours per day	10.8	3.6	1.0	0.2
Seasonal electricity cost = kWh/day x # of days in season x \$/kWh	\$202.69	\$137.94	\$18.77	\$7.66
Annual electricity cost per hypermarket = winter cost + summer cost	\$341		\$26	

[a] Assist processor winter value based on CARB staff field observations for two hypermarkets with ~1 million gallons per month throughput; ARID IOM assumes 7.2 hours per day at 30% duty cycle. Balance processor winter value based on assumption that 2 hours operation time is needed to control a 200 gph evaporation rate over an 8-hour overnight shutdown, if the blower moves 450 gph. Both assist and balance processor summer values assume processor operates only a fifth as much of the time as during the winter (rounded to 1 decimal place), given pressure driven emissions are currently about five times higher during the winter than the summer [CARB, 2020d and 2020e].

Table L-40 - Part C: Assumptions for cost estimates for electricity usage by an HCVP at a moderate throughput GDF

DESCRIPTION	ASSIST: Winter	ASSIST: Summer	BALANCE: Winter	BALANCE: Summer
Hours per day that the processor is operating ^[a]	3.6	1.2	1.0	0.2
Kilowatt hours per day (kWh/day): = kW x operating hours per day	5.4	1.8	0.5	0.1
Seasonal electricity cost = kWh/day x # of days in season x \$/kWh	\$101.35	\$68.97	\$9.38	\$3.83
Annual electricity cost per moderate throughput GDF = winter cost + summer cost	\$170		\$13	

[a] Values assumed to be half of hypermarket values.

Table L-41: Summary of ongoing annual costs and savings for HCVP operation per business-owned GDF estimated by Tables L-37 through L-40

DESCRIPTION	ASSIST: Hyper- markets	ASSIST: Small Business and Other GDFs	BALANCE: Hyper- markets	BALANCE: Small Business and Other GDFs
Annual maintenance cost per GDF	\$750	\$750	\$200	\$200
Fuel savings (assist) and costs (balance) per GDF [^]	-\$1,100 (savings)	-\$239 (savings)	\$190	\$27
Electricity cost per year to operate HCVP per GDF	\$341	\$170	\$26	\$4
Total ongoing annual savings (assist hypermarkets) and costs (other GDFs) for operating and maintaining HCVPs per GDF	-\$9 (savings)	\$681 (costs)	\$416 (costs)	\$231 (costs)

[^] CARB staff evaluated potential fuel savings for assist GDFs that install an HCVP using multiple methods and selected the higher (more optimistic) fuel savings estimate for each category of assist GDFs to assess the potential best-case statewide scenario for HCVP costs. For statewide cost estimates, CARB staff uses the average estimated annual fuel savings of \$1,100 per hypermarket (from Table L-37) and \$239 per moderate throughput GDF (from Table L-38, Method 2 Part B).

Table L-42: Estimation of statewide initial costs under Alternative 4 to install HCVPs at all existing and new business-owned GDFs with ISD

Description	ASSIST: GDFs Owned by Small Businesses	ASSIST: Hyper- markets	ASSIST: GDFs Owned by Other Businesses	BALANCE: GDFs Owned by Small Businesses	BALANCE: Hyper- markets	BALANCE: GDFs Owned by Other Businesses	TOTAL
# of existing and new business-owned GDFs required to install HCVP	2,381	237	1,275	2,911	172	1,559	8,535
Cost for consultant to research options and prepare permit applications	\$1,800	\$1,200	\$1,200	\$1,800	\$1,200	\$1,200	---
Permitting cost per GDF	\$2,315	\$2,315	\$2,315	\$2,315	\$2,315	\$2,315	---
Equipment cost per GDF	\$45,000	\$50,000	\$50,000	\$13,500	\$15,000	\$15,000	---
Installation cost per GDF	\$37,500	\$33,750	\$33,750	\$9,800	\$8,820	\$8,820	---
Subtotal: Costs assumed to be subject to loan interest	\$86,615	\$87,265	\$87,265	\$27,415	\$27,335	\$27,335	---
Subtotal: Costs plus loan interest (assumes 5-year loan with 5% interest)	\$100,030	\$100,781	\$100,781	\$31,661	\$31,569	\$31,569	---
Cost per GDF for GDF owner time to research processor options and hire consultant	\$496	\$248	\$248	\$496	\$248	\$248	---
Total cost per GDF	\$100,526	\$101,029	\$101,029	\$32,157	\$31,817	\$31,817	---
TOTAL STATEWIDE INITIAL COSTS TO INSTALL HCVPs^[a]	\$239,352,323	\$23,943,786	\$128,811,507	\$93,610,264	\$5,472,530	\$49,602,757	\$540,793,167

[a] Comparison to initial costs under the proposed amendments:

All business-owned GDFs: = \$540,793,167 - \$11,077,006 [from Table L-48b, includes both required and voluntary actions]
 = \$529,716,161 additional costs under Alternative 4

Small business-owned GDFs: = (\$239,352,323 + \$93,610,264) - \$8,890,748 [from Table L-54, includes both required and voluntary actions]
 = \$324,071,839 additional costs for small GDF businesses under Alternative 4

Table L-43: Estimation of statewide initial costs under Alternative 4 to install HCVPs at all existing and new business-owned GDFs with ISD that may not experience any ISD overpressure alarms

Description	ASSIST: GDFs Owned by Small Businesses	ASSIST: Hyper- markets	ASSIST: GDFs Owned by Other Businesses	BALANCE: GDFs Owned by Small Businesses	BALANCE: Hyper- markets	BALANCE: GDFs Owned by Other Businesses	TOTAL
# of existing and new GDFs required to install HCVP	2,381	237	1,275	2,911	172	1,559	8,535
% of GDFs that had no ISD overpressure alarms during the prior three years [CARB, 2020b, Appendix III; CARB, 2020n]	5%	0%	5%	43%	0%	43%	---
Estimated # of existing GDFs statewide that may not experience any ISD overpressure alarms	119	0	64	1,252	0	670	2,105
Total initial cost per GDF to install an HCVP [from Table L-44]	\$100,526	\$101,029	\$101,029	\$32,157	\$31,817	\$31,817	---
Total statewide initial cost to install HCVPs at GDFs that may not experiences ISD overpressure alarms and therefore have no cost savings from foregone (avoided) response costs	\$11,967,616	\$0	\$6,440,575	\$40,252,413	\$0	\$21,329,186	\$79,989,791

B. IMPROVE ISD REPORTS

Proposed Amendments

Proposed amendments to CP-201 would require the two current ISD manufacturers, INCON and Veeder-Root, to modify ISD software to include report date with year, and to report pressure values to two (2) decimal places, on the daily ISD reports. The ISD system manufacturers informed CARB staff that the proposed changes to the ISD software can be easily accomplished and can be done with negligible expense at the same time as the proposed changes to the ISD overpressure criteria described above. Consequently, these proposed amendments have no measurable direct impact on ISD manufacturers or indirect impact on consumers, business- and government-owned GDFs that purchase ISD system software. No fiscal impacts on local and state agencies have been identified.

Alternative 1 – No Action

The alternative to CARB staff's proposal to improve usefulness of ISD reports is to not amend the certification procedures to require the manufacturers of ISD equipment to modify the ISD report format. Under Alternative 1, daily ISD reports would maintain their current format. CARB staff rejected this alternative because, given the need for other changes to the software described in subsection 1, there would be negligible costs to make the format changes at the same time and further improve the usefulness of the daily pressure reports.

C. ALLOW ALTERNATIVE COMMUNICATION PORTS FOR ISD

Proposed Amendments

The proposed amendments to CP-201 would allow the two current ISD manufacturers, INCON and Veeder-Root, and future ISD manufacturers (none anticipated) to voluntarily replace the currently required RS-232 communication port with modern, readily available communication ports in ISD consoles. Once ISD consoles with any alternative ports are certified by CARB, they would become the only version of ISD consoles available for sale in California. It is possible ISD manufacturers could pass on any costs or cost-savings associated with replacing the RS-232 with a modern port to GDFs by changing ISD console prices. As a result, the proposed amendments could impact new GDFs, which are required to install the most recently certified ISD system at the time of construction, and existing GDFs that are required to replace ISD systems during major modifications or due to irreparable damage. In addition, the proposed amendments could impact service contractors and state and local regulators who need to access the ISD systems using the communication port during inspections and studies.

CARB staff identified four types of potential costs: (1) costs for CARB certification testing; (2) costs to manufacturers for CARB certification testing; (3) costs to the manufacturers to install a port type different from the RS-232; (4) potential passed-through costs to consumers

(owners of GDFs with ISD systems); and (5) costs to service contractors and regulators for additional adapters and cables. The following itemized sections provides an explanation of the methodology, staff assumptions, and data used in quantifying the potential costs and cost-savings for ISD manufacturers, business- and government-owned GDFs, and regulators.

CARB: ISD consoles certification testing

In order to reduce costs, ISD manufacturers informed CARB staff they would consider including only a modern port if the regulations are changed to allow an alternative port to the RS-232. They are considering including both an RS-232 port and one or more modern ports if the regulations are not changed. As a result, in this analysis CARB staff evaluates costs for CARB certification testing for two port types under BAU, and one port type under the proposed amendments. In addition, the manufacturers informed CARB staff that any change to the port type would be part of a suite of changes to their current ISD systems that are not associated with this rulemaking, and that they would not submit to CARB for certification testing any ISD consoles with alternative ports as a stand-alone change. Consequently, CARB staff assessed only the certification costs for CARB certification staff time needed to test the reliability and durability of the ports.

CARB has legal authority under the Health and Safety Code to charge fees to recover certification testing costs. As a result, CARB staff assumed the certification testing costs that could result from the proposed amendments would be fully recovered from ISD manufacturers and therefore would have no net fiscal impact on CARB.

Based on discussions with ISD manufacturers, consoles with alternative ports could be certified one to two years after the effective date of the amended regulation. For the purpose of this cost assessment, CARB staff assumes both manufacturers will complete the certification process during July 2021 through December 2022 (FY2021/22). The following estimates for costs for ISD manufacturers are based on CARB staff's review of recent certification invoices and communications with ISD manufacturers:

- **\$142.50** – Total one-time cost-savings for certification testing assumed to occur in FY2021/22 under the proposed amendments.
 - **\$285** (\$142.50 per manufacturer) cost under BAU for CARB certification staff time needed to assess two communication ports per model. This estimate assumes CARB staff would conduct three site visits at the beginning, middle, and end of the 180-day testing period between July and December 2021, and would need approximately 15 minutes per port per site visit for one staff with an hourly rate of \$95 to use a laptop and cable to download and review ISD reports. These assumptions are based on past ISD certification testing. CARB staff used this equation to estimate costs: = 3 site visits x 2 ports to be tested x 0.25 hours per port x 2 manufacturer models x \$95/hour = \$285.
 - \$142.50 (\$71.25 per manufacturer) cost under proposed amendments to reimburse CARB for CARB certification staff time needed to assess one

communication port per model. CARB staff used the same assumptions described above and this equation to estimate costs: = 3 site visits x 1 port to be tested x 0.25 hours per port x 2 manufacturer models x \$95/hour = \$142.50. Assessing one port rather than two ports per model results in a cost-savings in FY2021/22 for CARB certification testing under the proposed amendments compared to BAU: = \$285 cost under BAU - \$142.50 cost under proposed amendments = \$142.50 cost savings.

ISD Manufacturers: ISD console certification testing and port component costs

In order to reduce costs, ISD manufacturers informed CARB staff they would consider including only a modern port if the regulations are changed to allow an alternative port to the RS-232. They are considering including both an RS-232 port and one or more modern ports if the regulations are not changed. As a result, in this analysis CARB staff evaluates costs for manufacturer parts and CARB certification testing for two port types under BAU, and one port type under the proposed amendments. In addition, the manufacturers informed CARB staff that any change to the port type would be part of a suite of changes to their current ISD systems that are not associated with this rulemaking, and that they would not submit to CARB for certification testing any ISD consoles with alternative ports as a stand-alone change. Consequently, CARB staff assessed only the certification costs for CARB certification staff time needed to test the reliability and durability of the ports.

CARB certification testing costs are recovered from the ISD manufacturers.⁹ There are no new costs for re-designing and re-tooling the ISD system console boxes for alternate port dimensions because currently-certified ISD system console boxes already have slot openings that can accommodate modern port connections.

Based on discussions with ISD manufacturers, consoles with alternative ports could be certified one to two years after the effective date of the amended regulation. For the purpose of this cost assessment, CARB staff assumes both manufacturers will complete the certification process during July 2021 through December 2022 (FY2021/22), and CARB-certified ISD systems with alternative communication ports will be available for purchase by California customers in early 2023.

The following estimates for costs for ISD manufacturers are based on CARB staff's review of recent certification invoices and communications with ISD manufacturers:

⁹ Health and Safety Code § 41954(e) and § 41961 state that CARB, the State Fire Marshal, the Division of Measurement Standards, and the Division of Occupational Safety and Health may charge a reasonable fee for certification of a gasoline vapor control system or a component thereof, not to exceed the actual cost. CARB certification evaluation costs, including any cost increases resulting from amended or new standards and specifications such as those proposed for ISD software, are invoiced to and paid by the manufacturers seeking CARB certification to sell their products in California.

- **\$142.50** – Total one-time cost-savings for certification testing assumed to occur in 2022 under the proposed amendments
 - **\$285** (\$142.50 per manufacturer) cost under BAU to reimburse CARB for CARB certification staff time needed to assess two communication ports per model. This estimate assumes CARB staff would conduct three site visits at the beginning, middle, and end of the 180-day testing period between July and December 2021, and would need approximately 15 minutes per port per site visit for one staff with an hourly rate of \$95¹⁰ to use a laptop and cable to download and review ISD reports. These assumptions are based on past ISD certification testing. CARB staff used this equation to estimate costs: = 3 site visits x 2 ports to be tested x 0.25 hours per port x 2 manufacturer models x \$95/hour = \$285.
 - **\$142.50** (\$71.25 per manufacturer) cost under proposed amendments to reimburse CARB for CARB certification staff time needed to assess one communication port per model. CARB staff used the same assumptions described above and this equation to estimate costs: = 3 site visits x 1 port to be tested x 0.25 hours per port x 2 manufacturer models x \$95/hour = \$142.50. Assessing one port rather than two ports per model results in a cost-savings in 2021 for the two manufacturers: = \$285 cost under BAU - \$142.50 cost under proposed amendments = \$142.50 cost savings.
- **-\$10 per component** – Difference in cost between including two ports in an ISD console under BAU and one port under the proposed amendments. Based on a survey of computer component distributors, the average cost of an RS-232 port is about \$10, and the average cost of a modern port such as a USB port is about \$2 [CARB, 2020q]. Under BAU, CARB staff assumes the manufacturer includes one RS-232 port and one modern port for a total of \$11.45 per ISD system. Under the proposed amendments, CARB staff assumes the manufacturers include only one modern port for \$1.45 per ISD system.
- **3,104 GDFs** – Estimated number of GDFs that may be required under the proposed amendments to install ISD consoles with an alternative port between 2023 and 2030.
 - **2,532 GDFs** – Estimated number of existing GDFs that replace ISD consoles at the time of major modification or due to irreparable damage between 2023 (after the updated ISD software is available) and 2030. CARB staff estimates about 387 GDFs owned by small businesses, 2,139 GDFs owned by other businesses, 2 GDFs owned by local government, and 4 GDFs owned by federal government may be affected. These estimates are based on information about

¹⁰ CARB staff hourly rate: = $((\$203,000 + \$193,000)/2) \div 2080 = \$95.19 = \$95$ (rounded). Per CARB Administrative Services Division, as of May 2020, position costs for the two classifications for the budgeted year (including overhead, staff benefits, etc.) are: 1) Air Resources Engineer – \$203,000/year; 2) Air Pollution Specialist – \$193,000/year. Average the two, as staff are split, and divide the average annual salary by 2080 hours (52 week x 40 hours/week).

ISD console ages, a February 2020 Air District survey about GDFs with ISD, discussions with ISD manufacturers and small and large business owners about replacement habits, and the ratio of small business-owned GDFs estimated by CARB staff’s review of CERS UST ownership records [CERS, 2018].

- **572 GDFs** – Estimated number of new GDFs required to install ISD systems with an alternative port at the time of construction. CARB staff estimates about 354 GDFs owned by small businesses and about 218 GDFs owned by other businesses will construct new GDFs between 2023 and 2030. These estimates are based on a February 2020 Air District survey of recent construction permit trends, and the ratio of small business-owned GDFs estimated by CARB staff’s review of CERS UST ownership records [CERS, 2018].
 - See Table L-9 in section A for more information about the estimation method.
 - This analysis assumes a uniform age distribution of the existing GDFs so that an equal number of existing GDFs would replace ISD consoles in each year between 2023 and 2030. In addition, this analysis assumes an equal number of new GDFs would be constructed each year. Table L-43 provides the number of GDFs predicted to install new ISD consoles each year.
- Table L-52 provides the estimated net difference in costs of the proposed amendments for the ISD manufacturers by year compared to BAU. Between 2022 and 2030, manufacturers could experience a total cost-savings of about \$31,183.

Table L-43: Assumed timing of new ISD console installations at business- and government-owned GDFs under the proposed amendments

Category		2023	2024	2025	2026	2027	2028	2029	2030
Existing GDFs:	Small CA Businesses	49	49	49	48	48	48	48	48
	Other CA Businesses	155	155	155	155	155	155	155	155
	Non-CA Businesses	113	113	113	112	112	112	112	112
	Local Government	0	0	0	1	0	1	0	0
	Federal Government	1	0	1	0	1	0	1	0
New GDFs:	Small CA Businesses	45	45	44	44	44	44	44	44
	Other CA Businesses	16	16	16	16	16	16	16	16
	Non-CA Businesses	12	12	11	11	11	11	11	11

Business- and government-owned GDFs: Potential passed-through cost-savings from ISD manufacturers

Under the proposed amendments, ISD manufacturers could experience a total cost-savings of about \$31,183 between 2023 and 2030. To estimate the potential passed-through cost-savings to each consumer (business- and government-owned GDFs), CARB staff multiplied

the total cost-savings to manufacturers by estimated mark-up and divided by the number of GDFs assumed to purchase new ISD consoles between 2023 and 2030.

- **60 percent** – Potential manufacturer mark-up. CARB staff estimated potential manufacturer mark-up using this equation: $\text{Profit margin} \div (1 - \text{Profit margin}) = 37.5\% \div (1 - 37.5\%) = 60\%$. This calculation assumes ISD manufacturers fully pass on cost-savings and change ISD console prices to maintain a constant profit margin. The profit margin of 37.5% [Bizminer, 2020c] is based on the 'motor and generator manufacturing' sector (NAICS code 335312); industry financial reports were not available for other sector NAICS codes that may more accurately describe ISD manufacturers and other vapor recovery equipment manufacturers.
- **\$16.07** – Potential cost-savings per GDF. If ISD manufacturers were to pass on all cost-savings along with an estimated 60 percent mark-up, this would result in \$49,893 (\$31,183 x 1.6) in cost-savings to California GDFs over the lifetime of the regulation. If all GDFs predicted to purchase new ISD consoles are impacted by passed-through cost-savings, this could result in approximately \$16.07 in cost-savings per GDF (\$49,893 ÷ 3,104 impacted GDFs) when GDF owners purchase a new console. These potential passed-through costs are considered to be negligible both discretely and cumulatively when summed with other potential passed-through costs and savings that may result from all the proposed amendments (Table L-49).

Local government-owned GDFs with ISD: Potential passed-through cost-savings

- **\$32.14** – Total potential passed-through cost-savings between 2023 and 2030.
 - CARB staff estimates local agencies may be required to replace two ISD consoles between 2023 and 2030. Assuming ISD manufacturers fully pass on potential cost-savings, local agencies could have a passed-through cost-savings of approximately \$16.07 per GDF, for a total of \$32.14 between 2023 and 2030, assuming they have the same costs as business-owned GDFs.

State government-owned GDFs with ISD: Potential passed-through cost-savings

An Air District survey conducted in March 2020 indicates no state agencies own or operate any GDFs with ISD. Consequently, there are no direct nor indirect impacts (i.e., pass-on cost-savings) to state government-owned GDFs from this proposed amendment.

Service contractors and regulators: Additional adapters and cables

CARB staff evaluated potential long-term costs for service contractors hired by GDF owners and regulators (Air Districts and CARB) for cables compatible with modern ports compared to the RS-232. Because most new laptop computers have only standard USB ports, contractors and regulators already need to purchase a USB to RS-232 DB9 serial adapter to be able to connect to the Veeder-Root ISD console. As illustrated in Table L-44, costs for USB, micro USB, and Ethernet cables are similar to or less than costs for a USB to RS-232 DB9 serial adapter. Therefore, no long-term cost impacts on service contractors and

regulators are anticipated from implementation of the proposed amendments. Even after the proposed amendments are adopted, contractors and regulators would still likely need to maintain supplies of USB to RS-232 DB9 serial adapters through 2030 (the project period for this cost analysis) because it is likely that many but not all GDFs statewide will have replaced their ISD consoles with models that have a USB or other modern port(s) by 2030. Consequently, statewide costs for cables for contractors and regulators are expected to be the same under BAU and the proposed amendments and therefore do not need to be included in the statewide cost estimates.

Table L-44: Comparison of adapter and cable costs for RS-232 communication ports compared to modern communication ports

Cable and Adaptor Types	Average Cost	Cost Range
Items needed to download ISD reports from currently certified Veeder-Root ISD console ^[a]		
RS-232 serial null cable ^[c]	\$6.19	\$4.99 - \$7.99
USB (USB-A) to RS-232 DB9 serial adapter with attached cable ^[d]	\$15.24	\$9.98 - \$20.99
Items that may replace the RS-232 serial null model cable/adaptor in the future ^[a, b]		
USB to USB cable	\$6.97	\$3.90 - \$8.99
Micro-USB (USB-B) to micro-USB cable	\$7.99	\$7.99 - \$7.99
USB-C to USB-C cable	\$5.99	\$3.98 - \$7.99
USB to Micro-USB cable	\$5.02	\$2.99 - \$7.99
USB to USB-C cable	\$5.05	\$4.10 - \$5.99
Micro-USB to USB-C cable	\$13.22	\$5.44 - \$20.99
Ethernet cable	\$4.74	\$3.69 - \$5.99

[a] The currently-certified INCON ISD console does not require use of a RS-232 serial null cable and adapter because it has both RS-232 and USB ports.

[b] Costs for all items include a 6-foot cable (minimum) [CARB, 2020q].

[c] Cable type needed for laptop computers with an RS-232 connector.

[d] Adapter needed for laptop computers with a USB connector.

Alternative 1 – No Action

Under Alternative 1, there would be no change and the RS-232 port would continue to be required in all ISD consoles. CARB rejected this alternative because it does not address the problems associated with the RS-232 port, for example: during long data downloads, adapters often lose communication during the download; and ISD manufacturers have reported difficulty in procuring RS-232 communication modules and, when found, they prove to be costly. Industry requested that CARB revise the Phase II EVR ISD remote access port requirement in sections 9.1.3 and 9.8 of CP-201 to allow design flexibility to include modern

technologies. CARB staff agrees that the CP-201 requirement for all ISD consoles to have a RS-232 port puts unnecessary costs on ISD manufacturers, contractors, and regulators, and that amendments to CP-201 to allow flexibility are warranted. As illustrated in Table L-52, between 2022 and 2030, manufacturers could experience a total cost-savings of about \$31,183 under the proposed amendments, a savings that is not possible under the current regulations. It was not possible to quantify the potential costs to contractors and regulators under BAU.

Alternative 2 – Remove requirement for specific communication port

CARB staff considered removing all requirements for a specific communication port. However, there is a need for some level of standardization to ensure GDF contractors, Air District inspectors, and CARB staff can reliably download ISD system reports on-site. For this reason, the proposed amendments include the requirements that manufacturers must install “readily available” communication ports and must obtain CARB Executive Officer approval. CARB staff rejected this alternative because it is not as effective as the proposed amendments in achieving the purposes of the EVR regulations in a manner that ensures full compliance with the authorizing law. Potential costs to GDF owners, service contractors, and regulators could be higher under Alternative 2 than under the proposed amendments due to the potential need to purchase additional, potentially obscure adaptors and cables, but it is not possible to estimate such costs. For the summary tables in section I, CARB staff assumed the same costs and cost-savings for Alternative 2 as for the proposed amendments.

D. MAKE NOZZLE SPILLAGE PERFORMANCE STANDARDS MORE STRINGENT

Proposed Amendments

The proposed amendments would require nozzle manufacturers to comply with a more stringent nozzle spillage performance standard the next time they seek CARB certification for vapor recovery and ECO nozzles. There are currently six manufacturers that produce vapor recovery (balance and assist) nozzles and/or ECO nozzles already certified by CARB for sale in California, have submitted applications for nozzle certification, or have indicated to CARB staff that they are considering developing nozzles for certification. These include VST, Emco Wheaton Retail, Franklin Fueling Systems, OPW Retail Fueling, Husky Fueling Products, and Veeder-Root (Catlow). Of these, five manufacturers currently produce certified nozzles or have submitted nozzle prototypes for certification. None are based in California though they have sales offices in California or other western states.

The proposed amendments would lower the current spillage performance standards for vapor recovery and ECO nozzles to reflect and preserve the superior performance of currently-certified nozzles. CARB identified three types of potential new costs under the proposed amendments to the nozzle spillage standards: (1) additional costs for CARB for the certification process; (2) additional costs to manufacturers for CARB certification process; and

(3) potential passed-through certification process costs to consumers (owners of GDFs with EVR or ECO nozzles).

The proposed amendments will not have any direct economic impacts on business-owned GDFs or fiscal impacts on local and state agencies that own GDFs with EVR or ECO nozzles. All nozzles that will be in production in 2021, when the proposed amendments are anticipated to become effective, are currently compliant, and initial data for nozzle prototypes under certification testing indicate they could achieve the proposed standard. This means manufacturers of currently-certified nozzles will incur no new costs for development or design of nozzles as a result of the proposed amendments, and GDF operators will not be required to change out or retrofit their nozzles.

Further, an abbreviated administrative procedure (with no additional testing required) can be used to re-certify the nozzles as compliant with the proposed standard once it is adopted because CARB certification test data already demonstrate compliance.

Also, because the currently CARB-certified nozzles achieve the proposed nozzle spillage standard, GDF owners can continue to use their currently installed nozzles until the end of their useful life. Compliance with the proposed amendments would not require GDF owners to replace installed nozzles. In addition, implementation of the proposed amendments would not affect local agencies permitting workload or time spent participating in the CARB certification process.

The itemized list below provides an explanation of the methodology, staff assumptions, and data used in quantifying the potential direct costs for nozzle manufacturers and potential indirect costs for GDF owners.

CARB: Certification process

Based on certification Executive Order expiration dates and discussions with manufacturers, CARB staff assumes for these cost estimates that nozzle manufacturers of currently certified nozzles—three vapor recovery nozzles and two ECO nozzles—will complete certification renewal by 2023, and manufacturers for two ECO nozzles with certification testing currently underway will most likely be certified prior to spillage standard being amended and will therefore be renewed in 2024.

CARB has legal authority under the Health and Safety Code to charge fees to recover certification testing costs. As a result, CARB staff assumed the additional certification process costs that could result from the proposed amendments would be fully recovered from ISD manufacturers and therefore would have no net fiscal impact on CARB.

- **\$665** (\$95 per nozzle certification renewal) – Total cost under the proposed amendments to reimburse CARB for CARB certification staff time needed to incorporate into each nozzle certification renewal a comparison of the new standard to

the test data generated during prior certification testing. CARB certification staff would need minimal time to incorporate the revised spillage standard into the certification process because only the standard value would change; no changes to test procedures would be required. This estimate assumes CARB certification staff with an hourly rate of \$95 would need approximately 1 hour to complete the evaluation. These assumptions are based on past nozzle certification testing. CARB staff used this equation to estimate costs: = 7 nozzle renewals x 1 hour per renewal x \$95/hour = \$665.

- Table L-45 provides the assumed number of nozzle renewal evaluations to be completed each year, which are used for estimating the annual costs provided in Tables L-64, L-65, and L-66.

Nozzle manufacturers: Certification process

As noted earlier, CARB staff assumes for these cost estimates that nozzle manufacturers of currently certified nozzles—three vapor recovery nozzles and two ECO nozzles—will complete certification renewal by 2023, and manufacturers for two ECO nozzles with certification testing currently underway will most likely be certified prior to spillage standard being amended and will therefore be renewed in 2024.

- **\$665** (\$95 per nozzle certification renewal) – Total cost under the proposed amendments to reimburse CARB for CARB certification staff time needed to incorporate into each nozzle certification renewal a comparison of the new standard to the test data generated during prior certification testing. CARB certification staff would need minimal time to incorporate the revised spillage standard into the certification process because only the standard value would change; no changes to test procedures would be required. This estimate assumes CARB certification staff with an hourly rate of \$95 would need approximately 1 hour to complete the evaluation. These assumptions are based on past nozzle certification testing. CARB staff used this equation to estimate costs: = 7 nozzle renewals x 1 hour per renewal x \$95/hour = \$665.
- Table L-45 provides the number of nozzle renewal evaluations to be completed each year, which are used for estimating the estimated annual costs provided in Tables L-48 and L-52.

Table L-45: Assumed timing of CARB staff’s evaluations of spillage data from prior certification testing under the proposed amendments for nozzle certification renewals

Description	2021	2022	2023	2024
Number of CARB certification staff evaluations of nozzle spillage data from prior certification testing	1	2	2	2

Business- and government-owned GDFs: Potential passed-through costs from nozzle manufacturers

Nozzle manufacturers could experience a total new cost of about \$665 between 2021 and 2024 under the proposed amendments. To estimate the potential passed-through costs to each consumer (business- and government-owned GDFs), CARB staff multiplied the total costs to manufacturers by estimated mark-up and divided by the number of GDFs assumed to purchase nozzles between 2022 and 2030.

- **60 percent** – Potential manufacturer mark-up. CARB staff estimated potential manufacturer mark-up using this equation: $\text{Profit margin} \div (1 - \text{Profit margin}) = 37.5\% \div (1 - 37.5\%) = 60\%$. This calculation assumes nozzle manufacturers fully pass on costs and change nozzle prices to maintain a constant profit margin. (Section C provides additional information about the mark-up estimate.)
- **\$0.10** – Potential passed-through costs per GDF. If ISD manufacturers were to pass on all costs along with an estimated 60 percent mark-up, this would result in \$1,064 ($\665×1.6) in costs to California GDF owners over the lifetime of the regulation. If all GDFs that purchase vapor recovery and ECO nozzles are impacted by passed-through costs, this could result in approximately \$0.10 in costs per GDF ($\$1,064 \div 11,148$ impacted GDFs, including federally-owned GDFs, which are not included in the cost tables) during the 2022-2030 period, or an average of \$0.01 per year per GDF ($\$0.10 \div 9$ years). These potential costs are considered to be negligible even when summed with other passed-through costs and savings that may result from all the proposed amendments (Table L-49).

Alternative 1 – No Action

CARB staff considered not adopting any new amendments to the nozzle spillage standards amongst the three certification procedures. CP-201 and CP-206 would retain the spillage standard of 0.24 lbs/kgal while CP-207 would retain the more stringent spillage standard of 0.12 lbs/kgal. Alternative 1 would continue to allow unnecessary inconsistency between the three certification procedures and would not prevent the increase of emissions if manufacturers introduce inferior nozzles that comply with current performance standards. CARB staff rejected this alternative because it is not as effective as the proposed amendments in achieving a key goal of the rulemaking action: to prevent emissions from increasing. Further, the additional cost to implement the proposed amendments compared to BAU (about \$665) is negligible.

Alternative 2 – Align spillage standard in certification procedures to lowest current standard

Alternative 2 would focus solely on aligning nozzle spillage performance standards in the three certification procedures. Alternative 2 would lower the nozzle spillage standard in

CP-201 and CP-206 from 0.24 lbs/kgal to 0.12 lbs/kgal to align with the nozzle spillage standard listed in CP-207. This alternative would improve the consistency between the three certification procedures and lower the nozzle standard in two of the certification procedures. Alternative 2 would cost slightly less to implement than the proposed amendments because no additional CARB certification staff time would be needed during the next ECO nozzle certification renewals. Because additional CARB staff time would be needed for only four nozzle certification renewals rather than seven renewals described under the proposed amendments, the estimated certification costs under Alternative 2 are about \$380 compared to \$665 under the proposed amendments, a cost difference of \$285.

However, a 0.12 lbs/kgal nozzle spillage standard is substantially higher than the performance capability of currently certified nozzles and would not prevent the increase of emissions if manufacturers introduce inferior nozzles, while still complying with the proposed 0.12 lbs/kgal standard. CARB staff rejected this alternative because it is not as effective as the proposed amendments in achieving a key goal of the rulemaking action: to prevent emissions from increasing. Further, the cost difference of \$285 is negligible.

E. REQUIRE PHYSICAL SAMPLES OF CERTIFIED VAPOR RECOVERY EQUIPMENT

Proposed Amendments

This proposed amendment would require equipment manufacturers to provide CARB with physical samples of new systems and/or components once they have successfully complied with applicable performance standards or specifications. The proposed requirement applies only to first-time certifications and renewal certifications of systems or components that have design or material changes on or after January 1, 2022. If requested by the CARB Executive Officer, manufacturers also would be required to provide cut-aways of certain components such as hanging hardware (nozzle, breakaway, etc.) in addition to the fully intact item requested above. In lieu of submitting a complete system or component, in order to reduce costs where feasible, the CARB Executive Officer may request submission of only sub-parts or sub-assemblies that are crucial in controlling emissions. These amendment attributes are designed to avoid unnecessary material and storage resources to ensure compliance with the proposed amendments has minimal economic impact for equipment manufacturers and CARB and no significant environmental impacts. The physical samples will be stored in a CARB equipment archive that can be used to identify and document certified design and provide enforcement tools for uncertified design or material changes that may occur.

There are 16 equipment manufacturers that produce currently-certified Phase I and II EVR systems and components, ECO nozzles, and low permeation hoses. Two of the manufacturers are based in California, and one of these two meets the definition of a small business.

CARB staff identified three types of potential costs: (1) costs to manufacturers for the physical samples to be archived; (2) potential passed-through costs to consumers (owners of

GDFs who purchase equipment); and (3) storage costs for CARB. The itemized list below provides an explanation of the methodology, staff assumptions, and data used in quantifying the potential costs for equipment manufacturers, business- and government-owned GDFs, and CARB.

Equipment manufacturers: Potential costs of equipment samples

Given nearly all manufacturers have submitted samples during the last 10 years, there is likely negligible actual cost difference between the proposed amendments and BAU. However, costs from voluntary actions cannot be included in this regulatory cost analysis. As a result, CARB staff assumes for BAU cost estimates that no manufacturer would submit equipment samples. Table L-46 describes the type and number of vapor recovery systems and components that CARB staff anticipates manufacturers may submit under the proposed amendments during 2021-2030 for first-time certifications and renewal certifications that may have design or material changes. CARB staff bases these estimates on the number of new and modified certification applications submitted during the past 10 years and on informal discussions with manufacturers. Table L-46 identifies which items the CARB Executive Officer is likely to require for the CARB archive and the rationale and estimated cost for each.

- **\$14,405.71** – Total one-time cost for equipment samples assumed to be submitted between 2021 and 2030 (\$507 to \$2,643 per equipment certification). This cost estimate is based on the following assumptions:
 - CARB staff based the estimated costs in Table L-46 on a survey of retail vendors of comparable, currently-certified items conducted in February 2020. CARB staff assumed that retail prices incorporate a mark-up of 20% on average and therefore reduced the average of retail prices by 20% to estimate manufacturer costs. The estimated costs do not include local taxes because the manufacturers would provide the items; CARB would not purchase the items from retail vendors.
 - The estimated costs in Table L-46 assume that the CARB Executive Officer will request a cut-away for some but not every system or component. For the items CARB staff predicts the Executive Officer would require a cut-away, the costs sum the item cost and the item cost multiplied by 30% for the increase in cost for a cut-away. The preparation of a cut-away requires several additional costs compared to the tested item, such as engineering design, tooling, manufacturing employee time, and material costs.
 - Some manufacturers might apply for CARB certification for new systems that are comprised entirely of components that are already certified by CARB. Component and storage costs are included in the total archive costs for the proposed amendments only if the items are not currently CARB-certified.

- To estimate average annual costs to equipment manufacturers likely to submit archive samples under the proposed amendments, CARB staff used this equation: = \$14,405.71 ÷ 10 years = \$1,440.57 per year.

Table L-46: Estimated number and archive sample costs for manufacturers for anticipated first-time CARB certifications and renewal certifications that have design or material changes during 2021-2030

System / Component	# of new or modified system(s) or component(s) predicted during next 10 years	Estimated manufacturer cost per system or component	CARB Executive Officer expected to require archive samples under proposed amendments?	Estimated # of items likely to be archived under proposed amendments	Estimated costs for intact & cut-away samples likely to be archived under proposed amendments ^[a]
Phase I EVR remote-fill system	1 ^[b]	\$4,748.31	NO	0	\$0
Phase I EVR P/V valve	2 ^[c]	\$523.31	Yes	4	\$2,407.23
ECO nozzle	2 ^[d]	\$220.26	Yes	4 ^[c]	\$1,013.20
Phase II EVR ISD system hardware (console)	2 ^[e]	\$2,642.64	Yes	2 ^[d]	\$5,285.28
Phase II EVR ISD system software	6 ^[f]	\$950.00	Yes	6	\$5,700.00

[a] Total estimated cost during 2021-2030: \$14,405.71.

- [b] CARB staff predicts one new Phase I remote fill system might be submitted for certification review during the next 10 years. The remote-fill system would be comprised of the following product and vapor components: dust cap, adaptor, spill container, drop tube, and overflow prevention device. CARB staff estimated the cost of a new remote fill system as the currently-certified Phase I system minus the cost of a P/V valve, plus additional costs for a second adaptor for the remote fill, the fiberglass pipe leading to the remote fill adaptor, assumed to be 100 feet at \$25 per foot, and a "T" connector that connects the remote fill pipe to the drop tube pipe, estimated to cost about \$330 based on the only CARB-certified T connector: = (\$3,067.17 - \$654.14 + \$692.36 + (100 x \$25) + \$330) * 80% = \$4,748.31. However, the manufacturer has indicated the potential system would likely be comprised entirely of components that are already CARB-certified. As a result, the CARB Executive Officer would likely not require any of the components be submitted for archive under the proposed amendments.
- [c] CARB staff predicts two new P/V valve designs may be submitted for certification evaluation during the next 2 years. CARB staff assumes the CARB Executive Officer would request an intact P/V vent valve and cut-away for both newly certified valves for a total of four items. Of the two P/V valves anticipated to be submitted to CARB for certification testing, one is still undergoing manufacturer design and development, and the other is in the research and development phase. Both manufacturers have indicated that the product cost will be similar to the currently certified Husky P/V valve, which averages \$523.31.
- [d] There are two ECO nozzles currently under CARB certification review and likely to be certified before the proposed lower nozzle spillage standard is approved by the Office of Administrative Law. CARB staff assumes two more could be submitted by 2030. CARB staff assumes the CARB Executive Officer would request an intact nozzle and cut-away for both newly certified nozzles for a total of four items.

- [e] CARB staff anticipates two new ISD model consoles by 2030. Changes to the console would not affect other ISD components (e.g., flow meters and pressure sensor). A cut-away of the console would not be needed because there are no moving parts within the console. The most critical component is the ISD controller adaptor card, which is easily removed from the console and so a second card would not be needed for archive/cut-away under the proposed amendments.
- [f] CARB staff estimates six ISD system software upgrades will occur during the next 10 years because six software changes were certified for ISD systems during last 10 years. The Veeder-Root ISD system is currently hardware-based and therefore would need the ISD controller adapter card (aka memory card) to be replaced. CARB would archive the controller adapter card with the upgraded software. INCON software updates can be installed electronically via upload from a laptop to the ISD console or using a USB memory stick inserted directly into the console USB interface. Consequently, only a memory stick with the upgraded INCON software would need to be archived. No cut-aways would be needed for either system under the proposed amendments. Per the manufacturers, the purchase cost for a GDF operator to update Veeder-Root ISD software to version 1.06 is \$1,486, and the cost for Incon is \$395. CARB staff uses the average of this range to estimate future archive costs: $(\$400 + \$1500) \div 2 = \$950$ per software change.

Business- and government-owned GDFs: Potential passed-through costs from equipment manufacturers

Equipment manufacturers could experience a total new cost of about \$14,405.71 between 2021 and 2030 under the proposed amendments. To estimate the potential passed-through costs to each consumer (business- and government-owned GDFs), CARB staff multiplied the total costs to manufacturers by estimated mark-up and divided by the number of GDFs assumed to purchase equipment between 2022, which is likely the first year consumers might experience passed-through costs for any equipment certified in 2021, and 2030.

- **60 percent** – Potential manufacturer mark-up. CARB staff estimated potential manufacturer mark-up using this equation: $\text{Profit margin} \div (1 - \text{Profit margin}) = 37.5\% \div (1 - 37.5\%) = 60\%$. This calculation assumes equipment manufacturers fully pass on costs and change equipment prices to maintain a constant profit margin. (Additional information about the mark-up estimate provided in the.)
- **\$1.58** – Potential passed-through costs per GDF. If equipment manufacturers were to pass on all costs along with an estimated 60 percent mark-up, this would result in \$23,049.14 ($\$14,405.71 \times 1.6$) in costs to California GDF owners over the lifetime of the regulation. If all GDFs that purchase Phase I or II EVR equipment or ECO nozzles/low permeation hoses are impacted by passed-through costs, this could result in approximately \$1.58 in costs per GDF ($\$23,049.14 \div 14,608$ impacted GDFs, including federally-owned GDFs, which are not included in the cost tables) during the 2022-2030 period, or an average of \$0.18 per year per GDF ($\$1.58 \div 9$ years). These potential passed-through costs are considered to be negligible both discretely and cumulatively when summed with other potential passed-through costs and savings that may result from all the proposed amendments (Table L-49).

CARB: Potential costs to store equipment samples

- **\$21.72** per year – Estimated annual warehouse storage cost by 2030.
 - Table L-47 describes the type and number of vapor recovery systems and components that CARB staff anticipates manufacturers may submit under the proposed amendments during 2021-2030 for first-time certifications and renewal certifications that may have design or material changes. CARB staff bases these estimates on the number of new and modified certification applications submitted during the past 10 years and on informal discussions with manufacturers. Table L-47 also identifies which items the CARB Executive Officer is likely to require cut-aways for the CARB archive and the rationale and estimated storage cost for each.
- **\$110 per year** – Estimated cost for CARB staff time needed to prepare submitted equipment for storage.
 - CARB staff estimates about 1 hour would be needed to complete a chain of custody upon receipt of certified equipment, to vacuum pack equipment with rubber or other degradable parts, and to drive to the off-site warehouse to archive all submitted equipment in secured (locked) storage. CARB staff estimates 11 separate submissions for the archive between July 2021 and December 2030 (Table L-47), and total estimated cost of CARB staff time to archive materials using this equation: 11 submissions x 1 hour/submission x \$95 hourly rate = \$1,045
 - Annual average costs during FY2021/22 through FY2029/30: = Total 2021-2030 cost ÷ 9.5 = \$110
 - Costs during FY2030/31 [July-December 2030]: = Total 2021-2030 costs ÷ 9.5 years ÷ 2 = \$55
- **\$2,233.02** – Estimated costs in FY2021/22 for storage supplies.
 - A vacuum packaging/sealing machine and plastic will be needed to archive equipment with rubber or other degradable parts. CARB staff conducted a survey in June 2020 that indicates vacuum packaging/sealing machines cost \$1,899 to \$2,199 each, and a 15-inch by 50-foot roll of full mesh, 3 millimeter packaging plastic costs \$12.47 to \$20.76 per roll. CARB staff assumes a vacuum packaging/sealing machine has a useful life of at least 10 years, given it likely will not need to be used more than a couple times per year. For these cost estimates, CARB staff assumed one machine and one case of 12 packaging plastic rolls would be purchased in FY2021/22, assuming the lowest cost of the cost ranges: = 1 vacuum machine (\$1,899) + 12 rolls of plastic (12 x \$12.47) + 9% local sales tax = \$2,233.02.

Table L-47: Estimated number and archive sample storage costs for anticipated first-time CARB certifications and renewal certifications that have design or material changes during 2021-2030 under proposed amendments and Alternative 2

System / Component ^[a]	# of New or Modified System(s) or Component(s) Predicted During Next 10 Years	Storage Foot Print for 1 Item ^[a] (square feet)	Estimated # of Items to Likely To Be Archived	Total Storage Foot Print by 2030	Estimated Annual Storage Cost ^[b, c]
Phase I EVR remote-fill system	1 ^[d]	25.85	0 / 1 ^[e]	25.85	\$114.77
Phase I EVR P/V valve	2 ^[e]	0.25	4 ^[f]	0.5	\$4.44
ECO nozzle	2 ^[f]	0.14	4 ^[g]	0.3	\$2.48
Phase II EVR ISD system hardware (console)	1 ^[g]	1.67	2 ^[h]	3.3	\$14.80
Phase II EVR ISD system software	6 ^[h]	Negligible space needed	6 ^[i]	Negligible space needed	\$0

- [a] Table K-1 in Appendix K provides the storage dimensions of each item. The footnotes for Table L-46 provide additional information and assumptions about the items.
- [b] Storage costs are calculated by the 'foot print' (in square feet) of each system or component multiplied by warehouse storage cost per square footage per month, and then multiplied by 12 (months in a year) to annualize the cost. CARB currently archives equipment at a warehouse that has a monthly storage cost of \$0.37 per square foot; CARB uses this storage fee to estimate storage costs.
- [c] Total estimated annual storage cost in FY2030/31 under proposed amendments: \$21.72
Total estimated annual storage cost in FY2030/31 under Alternative 2: \$136.49
- [d] CARB staff predicts one new Phase I remote fill system might be submitted for certification review during the next 10 years. The manufacturer has indicated the potential system would likely be comprised entirely of components that are already CARB-certified. As a result, the CARB Executive Officer would likely not require any of the components be submitted for archive under the proposed amendments. Alternative 2 would require submission of the entire system.
- [e] CARB staff predicts two new P/V valve designs may be submitted for certification evaluation during the next 2 years. CARB staff assumes the CARB Executive Officer would request an intact P/V vent valve and cut-away for both newly certified valves for a total of four items.
- [f] There are two ECO nozzles currently under CARB certification review and likely to be certified before the proposed lower nozzle spillage standard is approved by the Office of Administrative Law. CARB staff assumes two more could be submitted by 2030. CARB staff assumes the CARB Executive Officer would request an intact nozzle and cut-away for both newly certified nozzles for a total of four items.
- [g] CARB staff anticipates two new ISD model console by 2030. Changes to the console would not affect other ISD components (e.g., flow meters and pressure sensor). A cut-away of the console would not be needed because there are no moving parts within the console. The most critical component is the ISD controller adaptor card, which is easily removed from the console and so a second card would not be needed for archive/cut-away under the proposed amendments.
- [h] CARB staff estimates six ISD system software upgrades will occur during the next 10 years because six software changes were certified for ISD systems during last 10 years. The Veeder-Root ISD system is currently hardware-based and therefore would need the ISD controller adapter card (aka memory card) to be replaced. CARB would archive the controller adapter card with the upgraded software. INCON

software updates can be installed electronically via upload from a laptop to the ISD console or using a USB memory stick inserted directly into the console USB interface. Consequently, only a memory stick with the upgraded INCON software would need to be archived. No cut-aways would be needed for either system under the proposed amendments.

Alternative 1 – No Action

Under Alternative 1, no regulatory amendments would be made to require physical samples of components as certified. CARB staff rejected this alternative because the continued lack of a complete archive would leave CARB vulnerable to enforcement and legal problems if undisclosed changes are made to component materials or dimensional specifications that could negatively affect compliance with performance standards.

Alternative 2 – Require entire CARB-certified system or component

Under the Proposed Regulations, in lieu of submitting a complete system or component, in order to reduce costs where feasible, the Executive Officer may request submission of only sub-parts or sub-assemblies that are crucial in controlling emissions. Under Alternative 2, the manufacturer would be required to submit the entire system or component; there would be no CARB Executive Officer discretion to require submission of only sub-parts or sub-assemblies determined to be crucial in controlling emissions. Alternative 2 would ensure archive implementation consistency over time. However, it would lead to additional and likely unnecessary material and storage costs for manufacturers and CARB. For example, as shown in Table L-46, CARB staff anticipates the Executive Officer would not require the manufacturer to submit a Phase I EVR remote-fill system for the archive if it is comprised entirely of components that are already CARB-certified. Alternative 2 would require submission of this system, which could cost the manufacturer an additional \$4,748 in certification expenses, and cost CARB an additional \$115 per year in annual storage fees (Table 47), without improving regulatory and enforcement certainty. CARB staff rejected Alternative 2 because it would not avoid unnecessary material and storage resources, and therefore be less cost-effective for manufacturers and CARB.

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F. AMEND TEST PROCEDURES FOR REMOTE FILL PHASE I SYSTEM CONFIGURATIONS

Proposed Amendments

This proposed amendments to CARB test procedures TP-201.1C and TP-201.1D enable the test procedures to accommodate remote fill Phase I system designs, with their greater piping runs, as they become more common. The proposed amendments provide a process, with the table below, for determining the additional time needed to pressurize the product pathway as a function of pipe length:

Horizontal Length of Remote Fill Pipe (feet)	Time to Pressurize* (minutes)
≤ 50	5
51 ≤ 100	10
101 ≤ 150	15
151 ≤ 200	20
201 ≤ 250	25

* Time is based on a 4-inch diameter pipe and a flow rate of 200 cubic centimeters per minute.

The proposed amendments help the test procedures accommodate the longer remote fill piping runs, thereby preventing false indications of system leaks. In other words, the proposed amendments correct a short-coming in the procedures. The proposed amendments to the test procedures have no effect on equipment or time needed by service contractors and regulators to conduct the test procedures under BAU, and does not impose any new costs on regulated entities or regulatory agencies. As a result, there are no economic nor fiscal impacts to costs under BAU and these proposed amendments are not included in the cost tables for businesses and government agencies.

Alternative 1 – No Action

CARB staff considered not adopting any new amendments to TP-201.1C and TP-201.1D. Under Alternative 1, remote fill drop tubes that are longer than 50 feet, but still vapor leak tight, would continue to fail testing under TP201.1C and TP-201.1D, resulting in unnecessary costs for trouble-shooting, repairs, and a loss of business when refueling the UST is no longer allowed per Air District rules. It is not possible to quantify these costs. Nonetheless, CARB staff rejected this alternative because of the potential cost burden it places on GDFs with remote fill configurations without any reductions in emissions.

Alternative 2 – Decertify remote drop tube configurations

Alternative 2 would decertify remote drop tube configurations entirely. Decertifying remote drop tube and fill configurations would make it impossible for some existing, permitted GDFs to operate without major modifications, resulting in a loss of business and the capital investment associated with constructing the GDF, without any resulting improvement for emission reductions. Such action would be considered prescriptive and would not be

consistent with state law that encourages design flexibility of vapor recovery systems (Health and Safety Code §§ 41954(b) and 41958). It is not possible to quantify the potential costs under this alternative. Nonetheless, CARB staff rejected this alternative because there is no technical or emission-based need to decertify remote drop tube configurations, and doing so is not a reasonable alternative to amending the test procedures.

G. CORRECT THE PHASE II EVR UPGRADE DATES IN CP-206

Proposed Amendments

Amendments were made to CP-206 upgrade requirements for existing aboveground storage tank (AST) Phase II systems at the July 25, 2019 Board Hearing based upon whether an AST was located in an area classified by the U.S. Environmental Protection Agency as being in nonattainment with the federal 8-hour ozone standard and having an annual gasoline throughput of 480,000 gallons or less. The intent of the 2019 amendments was to grant such ASTs a delay in order to prevent costly upgrades before their existing system needed to be replaced. Staff inadvertently inserted the expiration date when the first Phase II EVR system was certified, and not the Board Hearing date, as intended, for the date establishing existing ASTs in the final regulatory text. The proposed amendments would insert the correct date. This correction does not introduce any new requirements for regulated entities (GDFs with ASTs) compared to the requirements described in the current certification procedures and 2019 CARB staff report [CARB, 2019b] presented to the Board and public in 2019.

CARB staff identified two types of costs under BAU that the proposed amendments would eliminate: (1) the incorrect date creates confusion for Air District enforcement staff as they conduct inspections and costs them time to research the dates and ultimately contact CARB staff for clarification; and (2) time needed by CARB staff to provide responses to Air Districts. The proposed amendment to the CP-206 date has no effect on implementation requirements for GDFs or other regulated entities and therefore is not included in the cost tables for businesses. The itemized list below provides an explanation of the methodology and staff assumptions used in quantifying the potential costs for Air Districts and CARB.

Air District enforcement staff: Time needed to research effective date for Phase II equipment upgrades

- **\$1,094** cost under BAU (\$31.25 per Air District) – Total cost under BAU for Air Districts over 9.5 years (July 2021 through December 2030) to obtain clarification (e.g., via email or telephone) about the effective date. There are 35 Air Districts in California. This estimate is based on the assumptions that each Air District would once seek clarification of the effective/operative date from CARB staff over 9.5 years, and on average, each clarification event would need 0.25 hour of Air District staff time. CARB staff assumes an average hourly rate for Air District staff of \$125 based on the average of hourly rates reported by survey of Air Districts in March 2020. To estimate

total costs to Air Districts, CARB staff used this equation: = 0.25 hour per clarification event x 1 events per Air District x 35 Air Districts x \$125/hour = \$1,093.75.

- **\$1,094** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for Air Districts to spend time seeking clarification from CARB staff.
- To estimate average annual cost-savings for the Air Districts under the proposed amendments in Tables L-55 and L-57, CARB staff used these equations:
 - Average annual statewide costs during FY2021/22 through FY2029/30:
= Total 2021-2030 cost ÷ 9.5 = \$115.13.
 - Estimated costs during FY2030/31 [July-December 2030]: = Total 2021-2030 costs ÷ 9.5 years ÷ 2 = \$57.57.

CARB Vapor Recovery Program staff: Time needed to respond to Air District questions about the effective date for Phase II equipment upgrades

- **\$831.25** cost under BAU (\$23.75 per response) – Total cost under BAU for CARB over 9.5 years (July 2021 through December 2030) to provide clarification (e.g., via email or telephone) about the effective date. This estimate is based on the assumptions that each Air District would once seek clarification of the effective/operative date from CARB staff over 9.5 years, and on average, each clarification event would need 0.25 hour of CARB staff time. To estimate total costs to CARB, CARB staff used this equation: = 0.25 hour per clarification event x 1 events per Air District x 35 Air Districts x \$95/hour = \$831.25.
- **\$831.25** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for CARB staff time to respond to questions about the effective date from Air Districts.
- To estimate average annual cost-savings for CARB under the proposed amendments in Tables L-62, L-64, L-65, and L-66, CARB staff used these equations:
 - Annual average statewide costs during FY2021/22 through FY2029/30: = Total 2021-2030 cost ÷ 9.5 = \$87.50
 - Costs during FY2030/31 [July-December 2030]: = Total 2021-2030 costs ÷ 9.5 years ÷ 2 = \$43.75

Alternative 1 – No Action

CARB staff considered not adopting any new amendments to correct the upgrade date but rejected this alternative because it would incorrectly require some AST owners to perform unnecessary and costly upgrades before the end of useful life of their existing systems. Alternative 1 acts against the intent of the 2019 amendment, which was to grant all existing ASTs with Phase II vapor recovery additional time to upgrade to Phase II EVR. In addition, the emissions and cost estimates for all existing ASTs meeting the upgrade delay

requirements were accounted for and provided by the 2019 Staff Report that was presented to the Board. Alternative 1 would continue to create confusion for Air District enforcement staff and may result in some ASTs owners incurring unnecessary cost by having to upgrade to Phase II if the current regulations are interpreted literally.

H. ADMINISTRATIVE CHANGES

As summarized in the following subsections, the proposed amendments include several administrative changes. Some of these proposed amendments were requested by industry, such as the proposal to incorporate by reference the 10 pages of text, tables, and figures for nozzle dimension requirements in three certification procedures that are redundant with dimensions depicted in SAE J285 and J1140. Others were recommended by Office of Administrative Law and CARB legal counsel, such as clarifying the definitions of performance standard and performance specification in CP-207. There are benefits under the proposed amendments in the form of some cost savings for manufacturers, Air Districts, and CARB associated with reducing confusion (and time needed to seek clarification from CARB staff) and reducing time needed to cross-reference multiple standards documents. The primary benefit of the proposed administrative changes is clarifying the certification and test procedures for better regulatory certainty and enforceability. CARB staff rejected the “No Action” alternative for each of these amendments because not amending the EVR regulations to provide better regulatory certainty and enforceability is not as effective in achieving the purposes of the EVR regulations. CARB staff did not identify any other alternatives that would lessen any adverse impact on business.

1. Replace placeholder language with actual dates for effective and operative dates for ECO nozzles in CP-207

This proposed amendment provides a specific operative and effective date, ‘March 1, 2019’, in CP-207 for ECO nozzles recently certified by CARB and removes placeholder language written before the first nozzle was certified. When the Board adopted CP-207 on April 23, 2015, no ECO nozzle had yet to be tested and certified by CARB staff. Therefore, the placeholder text “Date when first applicable ECO Nozzle is certified” was used instead of specific dates in Table 2-1 under both the Effective Date and Operative Date for nozzle spillage, post fueling drips, liquid retention, nozzle spitting, and insertion interlock. Now that CARB has certified an ECO nozzle, the placeholder text could be confusing for users (e.g., nozzle manufacturers who intend to apply for CARB certification or certification renewal). The intent of the proposed amendment is to clarify that there is now an effective and operative date and save users the time needed to research whether an ECO nozzle has been certified and its certification date. It is common CARB practice that once CARB certifies a system or component, then the date of certification is included the next time the certification procedure is amended. The proposed amendment does not introduce any new requirements for regulated entities (GDF owners).

CARB staff identified two types of costs under BAU that the proposed amendment would eliminate: (1) the placeholder language can create confusion for nozzle manufacturers and cost them time to research the dates and ultimately contact CARB staff for clarification; and (2) time needed by CARB staff to provide responses. The itemized list below provides an explanation of the methodology and staff assumptions used in quantifying the potential costs and cost-savings for ECO nozzle manufacturers and CARB, and potential passed-through cost-savings to consumers (owners of GDFs who purchase ECO nozzles).

ECO Nozzle manufacturers: Time needed to research requirements for certification applications

There are currently two manufacturers that produce ECO nozzles already certified by CARB for sale in California, OPW and VST, and CARB staff anticipates there will soon be two more manufacturers with certified ECO nozzles. None are based in California.

- **\$480** cost under BAU (\$120 per manufacturer) – Total cost under BAU for manufacturers over 10 years (2021-2030) to obtain clarification (e.g., via email or telephone) about effective and operative dates. This estimate is based on the assumptions that each manufacturer would twice seek clarification of the effective/operative date from CARB staff over 10 years, and on average, each clarification event would need 0.5 hour of manufacturer engineer time. CARB staff estimates an average hourly rate for manufacturer engineers of \$120 based on: mean hourly wage for a mechanical engineer in May 2018 in California was \$51.62 [USBLS, 2019a], and wages for private industry 'manufacturing' as a percent of total compensation in 2019 was 65.7% [USBLS, 2019b]. CARB staff used these equation to estimate hourly rate: $= \$51.62 \div 65.7\% = \$78.57 = \$80$ (rounded to one significant digit); and to account for all overhead costs: $= \$80 + (\$80 \times 50\%) = \$120/\text{hour}$. To estimate total costs to manufacturers, CARB staff used this equation: $= 0.5 \text{ hour per clarification event} \times 2 \text{ events per manufacturer} \times 4 \text{ manufacturers} \times \$120/\text{hour} = \$480$.
- **\$480** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for nozzle manufacturers to spend time seeking clarification from CARB staff.
- To estimate average annual cost-savings for the ECO nozzle manufacturers under the proposed amendments in Tables L-48 and L-52, CARB staff used this equation: $= \$480 \div 10 \text{ years} = \48 per year .

CARB: Time needed to respond to ECO nozzle manufacturers' questions as they research requirements for certification applications

There are currently two manufacturers that produce ECO nozzles already certified by CARB for sale in California, OPW and VST, and CARB staff anticipates there will soon be two more manufacturers with certified ECO nozzles.

- **\$380** cost under BAU – Total cost under BAU for CARB staff to respond to manufacturers over 10 years (2021-2030) to provide clarification (e.g., via email or telephone) about effective and operative dates. This estimate is based on the assumptions that each manufacturer would twice seek clarification of the effective/operative date from CARB staff over 10 years, and on average, each clarification event would need 0.5 hour of CARB staff time. To estimate total costs to CARB, CARB staff used this equation: $= 0.5 \text{ hour per clarification event} \times 2 \text{ events per manufacturer} \times 4 \text{ manufacturers} \times \$95/\text{hour} = \$380$.
- **\$380** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for CARB staff to spend time to respond to questions from nozzle manufacturers.
- To estimate average annual cost-savings for CARB under the proposed amendments in Tables L-62 and L-64, CARB staff used this equation: $= \$380 \div 10 \text{ years} = \38 per year .

Business- and government-owned GDFs: Potential passed-through cost-savings from ECO nozzle manufacturers

ECO nozzle manufacturers could experience a total new cost-savings of about \$480 between 2021 and 2030 under the proposed amendments. To estimate the potential passed-through cost-savings to each consumer (business- and government-owned GDFs with ECO nozzles), CARB staff multiplied the total costs to manufacturers by estimated mark-up and divided by the number of GDFs assumed to purchase equipment between 2022, which is likely the first year consumers might experience passed-through cost-savings for any certification efforts in 2021, and 2030.

- **60 percent** – Potential manufacturer mark-up. CARB staff estimated potential manufacturer mark-up using this equation: $= \text{Profit margin} \div (1 - \text{Profit margin}) = 37.5\% \div (1 - 37.5\%) = 60\%$. This calculation assumes equipment manufacturers fully pass on costs and change equipment prices to maintain a constant profit margin. (Section C provides additional information about the mark-up estimate.)
- **\$2.39** – Potential passed-through cost-savings per GDF. If manufacturers were to pass on all cost-savings along with an estimated 60 percent mark-up, this would result in \$768 ($\480×1.6) in cost-savings to California GDF owners over the lifetime of the regulation. If all GDFs that purchase ECO nozzles are impacted by passed-through cost-savings, this could result in approximately \$2.39 in cost-savings per GDF ($\$768 \div 322 \text{ impacted GDFs}$) during the 2022-2030 period, or an average of \$0.27 per year per GDF ($\$2.39 \div 9 \text{ years}$). These potential passed-through costs are considered to be negligible both discretely and cumulatively when summed with other potential passed-through costs and savings that may result from all the proposed amendments (Table L-49).

2. Make language describing performance standards and performance specifications in CP-207 consistent with language in CP-201

In 2018, the Board approved amendments to CP-207 to include more detailed ECO nozzle spout and insertion interlock dimensions to ensure compatibility with motor vehicle fill pipes. The amendments added text to CP-207 section 2 in order to better align its language with section 2 of CP-201. The amendments added five new paragraphs (sections 2.3.1 through 2.3.5) to describe how compliance deadlines are established when the standards and specifications are amended. In addition, the amendments included a new table (Table 2.1) that lists the operative and effective dates for the various ECO and low permeation conventional hose requirements. Although these edits improved the clarity and consistency of CP-207 with CP-201, the word “specification” remained inadvertently incorrectly placed within two locations of the first paragraph of section 2.3. In addition, the definitions for “performance standard” and “performance specification” were both missing clarifying words that are included in the definitions in CP-201.

This proposed amendment makes the language in section 2 of CP-207 consistent with the language in section 2 of CP-201. This action is needed to provide clarity and consistency for those seeking CARB certification or for other stakeholders seeking to understand how compliance deadlines are established when amendments to either performance standards or specifications are made. The amended text better explains the distinction between standards and specifications. The amendments were recommended by Office of Administrative Law and CARB legal counsel because the distinction is needed for determining compliance deadlines for existing GDFs when the regulation is amended to include new requirements. CARB staff’s proposal does not introduce any new requirements, and instead clarifies CP-207 for better regulatory certainty.

CARB staff identified two types of costs under BAU that the proposed amendment would eliminate: (1) the current language could potentially create confusion for equipment manufacturers and cost them time to contact CARB staff for clarification; and (2) time needed by CARB staff to provide responses. The itemized list below provides an explanation of the methodology and staff assumptions used in quantifying the potential costs and cost-savings for manufacturers of ECO nozzles and low permeation conventional hoses and CARB, and potential passed-through costs to consumers (owners of GDFs who purchase ECO nozzles and low permeation hoses).

Manufacturers of ECO nozzles and low permeation conventional hoses: Time needed to research requirements for certification applications

There are currently six manufacturers that produce ECO nozzles and low permeation hoses already certified by CARB for sale in California: ContiTech, Franklin, Husky, and Parker produce low permeation hoses; and OPW and VST produce ECO nozzles.

- **\$360** cost under BAU (\$60 per manufacturer) – Total cost under BAU for manufacturers over 10 years (2021-2030) to obtain clarification (e.g., via email or

telephone). This estimate is based on the assumptions that each manufacturer would once seek clarification from CARB staff over 10 years, and on average, each clarification event would need 0.5 hour of manufacturer engineer time. CARB staff estimates an average hourly rate for manufacturer engineers of \$120 based on: mean hourly wage for a mechanical engineer in May 2018 in California was \$51.62 [USBLS, 2019a], and wages for private industry 'manufacturing' as a percent of total compensation in 2019 was 65.7% [USBLS, 2019b]. CARB staff used these equation to estimate hourly rate: $= \$51.62 \div 65.7\% = \$78.57 = \$80$ (rounded to one significant digit); and to account for all overhead costs: $= \$80 + (\$80 \times 50\%) = \$120/\text{hour}$. To estimate total costs to manufacturers, CARB staff used this equation: $= 0.5 \text{ hour per clarification event} \times 1 \text{ event per manufacturer} \times 6 \text{ manufacturers} \times \$120/\text{hour} = \$360$.

- **\$360** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for equipment manufacturers to spend time seeking clarification from CARB staff.
- To estimate average annual cost-savings for the manufacturers under the proposed amendments in Tables L-48 and L-52, CARB staff used this equation: $= \$360 \div 10 \text{ years} = \36 per year.

CARB: Time needed to respond to equipment manufacturers' questions as they research CP-207 requirements for certification applications

There are currently six manufacturers that produce ECO nozzles and low permeation hoses already certified by CARB for sale in California: ContiTech, Franklin, Husky, and Parker produce low permeation hoses; and OPW and VST produce ECO nozzles.

- **\$285** cost under BAU (\$47.50 per response) – Total cost under BAU for CARB over 10 years (2021-2030) to provide clarification (e.g., via email or telephone). This estimate is based on the assumptions that each manufacturer would once seek clarification from CARB staff over 10 years, and on average, each clarification event would need 0.5 hour of CARB staff time. To estimate total costs to CARB, CARB staff used this equation: $= 0.5 \text{ hour per clarification event} \times 1 \text{ event per manufacturer} \times 6 \text{ manufacturers} \times \$95/\text{hour} = \$285$.
- **\$285** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for equipment manufacturers to seek clarification from CARB staff.
- To estimate average annual cost-savings for CARB under the proposed amendments in Tables L-62 and L-64, CARB staff used this equation: $= \$285 \div 10 \text{ years} = \28.50 per year.

Business- and government-owned GDFs: Potential passed-through cost-savings from manufacturers of ECO nozzles and low permeation hoses

The manufacturers could experience a total new cost-savings of about \$360 between 2021 and 2030 under the proposed amendments. To estimate the potential passed-through cost-savings to each consumer (business- and government-owned GDFs with ECO nozzles and low permeation hoses), CARB staff multiplied the total costs to manufacturers by estimated mark-up and divided by the number of GDFs assumed to purchase equipment between 2022, which is likely the first year consumers might experience passed-through cost-savings for any certification efforts in 2021, and 2030.

- **60 percent** – Potential manufacturer mark-up. CARB staff estimated potential manufacturer mark-up using this equation: $\text{Profit margin} \div (1 - \text{Profit margin}) = 37.5\% \div (1 - 37.5\%) = 60\%$. This calculation assumes equipment manufacturers fully pass on costs and change equipment prices to maintain a constant profit margin. (Section C provides additional information about the mark-up estimate.)
- **\$1.79** – Potential passed-through cost-savings per GDF. If manufacturers were to pass on all cost-savings along with an estimated 60 percent mark-up, this would result in \$576 ($\360×1.6) in cost-savings to California GDF owners over the lifetime of the regulation. If all GDFs that purchase ECO nozzles and low permeation hoses are impacted by passed-through cost-savings, this could result in approximately \$1.79 in cost-savings per GDF ($\$576 \div 322$ impacted GDFs) during the 2022-2030 period, or an average of \$0.20 per year per GDF ($\$1.79 \div 9$ years). These potential passed-through costs are considered to be negligible both discretely and cumulatively when summed with other potential passed-through costs and savings that may result from all the proposed amendments (Table L-49).

3. Amend the title of CP-201 to include the text “with Underground Storage Tanks” at the end of the title

The title of CP-201 does not specify that it regulates only GDFs with USTs. Stakeholders have indicated to CARB staff that the lack of specificity has created confusion about the applicability of CP-201, particularly because only one paragraph in the entire document (section 1, General Information and Applicability), explicitly states that the certification procedure applies to facilities equipped with USTs. To address this problem, this proposed amendment adds the text “with Underground Storage Tanks” at the end of the title of CP-201:

Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities with Underground Storage Tanks

This proposal is intended to reduce stakeholder confusion about the applicability of CP-201. CARB staff’s proposal does not introduce any new requirements.

CARB staff identified two types of direct costs under BAU that the proposed amendment would eliminate: (1) the current title can create confusion for vapor recovery equipment manufacturers and cost them time to contact CARB staff for clarification; and (2) time needed by CARB staff to provide responses. The itemized list below provides an explanation of the methodology and staff assumptions used in quantifying the potential direct costs and cost-savings for equipment manufacturers and CARB, and potential passed-through costs to consumers (owners of GDFs who purchase Phase I or Phase II vapor recovery equipment).

Vapor recovery equipment manufacturers: Time needed to research requirements for certification applications

There are currently 15 manufacturers that produce vapor recovery equipment certified by CARB for sale in California. Two of the manufacturers are based in California, and one of these two meets the definition of a small business.

- **\$450** cost under BAU (\$30 per manufacturer) – Total cost under BAU for manufacturers over 10 years (2021-2030) to obtain clarification (e.g., via email or telephone). This estimate is based on the assumptions that each manufacturer would once seek clarification from CARB staff over 10 years, and on average, each clarification event would need 0.25 hour of manufacturer engineer time. CARB staff estimates an average hourly rate for manufacturer engineers of \$120 based on: mean hourly wage for a mechanical engineer in May 2018 in California was \$51.62 [USBLS, 2019a], and wages for private industry 'manufacturing' as a percent of total compensation in 2019 was 65.7% [USBLS, 2019b]. CARB staff used these equation to estimate hourly rate: $= \$51.62 \div 65.7\% = \$78.57 = \$80$ (rounded to one significant digit); and to account for all overhead costs: $= \$80 + (\$80 \times 50\%) = \$120/\text{hour}$. To estimate total costs to manufacturers, CARB staff used this equation: $= 0.25 \text{ hour per clarification event} \times 1 \text{ event per manufacturer} \times 15 \text{ manufacturers} \times \$120/\text{hour} = \$450$.
- **\$450** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for equipment manufacturers to spend time seeking clarification from CARB staff.
- To estimate average annual cost-savings for the manufacturers under the proposed amendments in Tables L-48 and L-52, CARB staff used these equations:
 - Small California business: $1 \text{ manufacturer} \times \$30 \div 10 \text{ years} = \3 per year .
 - Other California business: $1 \text{ manufacturer} \times \$30 \div 10 \text{ years} = \3 per year .
 - Non-California businesses:¹¹ $13 \text{ manufacturers} \times \$30 \div 10 \text{ years} = \39 per year .

¹¹ CARB staff uses the phrase "non-California business" to describe businesses that are headquartered outside of California.

CARB: Time needed to respond to questions from manufacturers as they research requirements for certification applications

There are currently 15 manufacturers that produce vapor recovery equipment certified by CARB for sale in California.

- **\$356.25** cost under BAU (\$23.75 per response) – Total cost under BAU for CARB over 10 years (2021-2030) to provide clarification (e.g., via email or telephone). This estimate is based on the assumptions that each manufacturer would once seek clarification from CARB staff over 10 years, and on average, each clarification event would need 0.25 hour of CARB staff time. To estimate total costs to CARB, CARB staff used this equation: = 0.25 hour per clarification event x 1 event per manufacturer x 15 manufacturers x \$95/hour = \$356.25.
- **\$356.25** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for equipment manufacturers to seek clarification from CARB staff.
- To estimate average annual cost-savings for CARB under the proposed amendments in Tables L-62 and L-64, CARB staff used this equation: = \$356.25 ÷ 10 years = \$35.63 per year.

Business- and government-owned GDFs: Potential passed-through cost-savings from manufacturers

The manufacturers could experience a total new cost-savings of about \$450 between 2021 and 2030 under the proposed amendments. To estimate the potential passed-through cost-savings to each consumer (business- and government-owned GDFs that purchase Phase I or Phase II vapor recovery equipment), CARB staff multiplied the total costs to manufacturers by estimated mark-up and divided by the number of GDFs assumed to purchase equipment between 2022, which is likely the first year consumers might experience passed-through cost-savings for any certification efforts in 2021, and 2030.

- **60 percent** – Potential manufacturer mark-up. CARB staff estimated potential manufacturer mark-up using this equation: = Profit margin ÷ (1 - Profit margin) = 37.5% ÷ (1 - 37.5%) = 60%. This calculation assumes equipment manufacturers fully pass on costs and change equipment prices to maintain a constant profit margin. (Section C provides additional information about the mark-up estimate.)
- **\$0.05** – Potential passed-through cost-savings per GDF. If manufacturers were to pass on all cost-savings along with an estimated 60 percent mark-up, this would result in \$720 (\$450 x 1.6) in cost-savings to California GDF owners over the lifetime of the regulation. If all GDFs that purchase vapor recovery equipment are impacted by passed-through cost-savings, this could result in approximately \$0.05 in cost-savings on average per GDF (\$720 ÷ 14,286 impacted GDFs, including federally-owned GDFs, which are not included in the cost tables) during the 2022-2030 period, or an average of \$0.006 per year per GDF (\$0.05 ÷ 9 years). These potential passed-through costs

are considered to be negligible both discretely and cumulatively when summed with other potential passed-through costs and savings that may result from all the proposed amendments (Table L-49).

4. Decrease the length of CP-201, CP-206, and CP-207 by ten pages of text, figures and tables by incorporating nozzle dimensions by reference to SAE J285 and SAE J1140 documents

In October 2018, the Board approved amendments to CP-201, CP-206, and CP-207, to standardize EVR and ECO nozzle spout and bellows dimensions to improve compatibility with newer motor vehicle fill pipes. This compatibility was necessary to reduce air ingestion at the nozzle, which is intended to help reduce pressure driven emissions caused by evaporation of gasoline within the GDF storage tank headspace. The 2018 amendments consist of 10 pages of text, figures, and tables that define the dimension specifications.

Since then, the Society of Automotive Engineers (SAE) revised two documents such that they now contain the identical nozzle spout and bellows dimensions:

- Surface Vehicle Recommended Practice SAE J285: Dispenser Nozzle Spouts for Liquid Fuels Intended for Use with Spark Ignition and Compression Ignition Engines. Revised April 2019.
- Recommended Practice SAE J1140: Filler Pipes and Openings of Motor Vehicle Fuel Tanks. Revised October 2019.

This proposed amendment would incorporate the nozzle spout and bellows dimension specifications in CP-201, CP-206, and CP-207 by reference to the revised versions of SAE J285 and SAE J1140, rather than continuing to include the full 10 pages of identical materials in the three certification procedures. Both nozzle manufacturers and automotive industry representatives endorse this option because they prefer to have dimension requirements consolidated in standards document(s) from one source. In addition, CARB staff endorses this option because the 10 pages of text, tables, and figures make the certification procedures more cumbersome to navigate and yet are relevant for only about six nozzle manufacturers. The proposed amendment does not introduce any new requirements for regulated entities nor regulating agencies; instead, it simply would reduce the length of the certification procedures by 10 pages by referencing the identical material in the two SAE documents.

The proposed amendments would reduce the time needed by nozzle manufacturers to prepare CARB certification applications by reducing time needed to cross-reference SAE J285 and J1140 with the three CARB certification procedures. The itemized list below provides an explanation of the methodology and staff assumptions used in quantifying the potential direct costs and cost-savings for manufacturers of EVR and ECO nozzles, and potential passed-through cost-savings to consumers (business- and government-owned GDFs

that purchase EVR or ECO nozzles). CARB staff did not identify any other direct nor indirect fiscal impacts to local and state agencies.

Manufacturers of EVR or ECO nozzles: Time needed to research requirements for certification applications

There are currently six manufacturers that either produce vapor recovery (balance and assist) nozzles and ECO nozzles already certified by CARB for sale in California, have submitted applications for nozzle certification, or have indicated to CARB staff that they are considering developing nozzles for certification. These include VST, Emco Wheaton Retail, Franklin Fueling Systems, OPW Retail Fueling, Husky Fueling Products, and Veeder-Root (Catlow). Of these, five manufacturers currently produce certified nozzles or have submitted nozzle prototypes for certification. None are based in California though they have sales offices in California or other western states.

- **\$2,160** cost under BAU (\$360 per manufacturer) – Total cost under BAU for manufacturers over 3 years (2021-2024) to cross-reference detailed nozzle dimensions in SAE J285 and J1140 to CARB certification procedures. This estimate is based on the assumptions that each manufacturer would complete the cross-reference exercise once during the next three years as they prepare certification or renewal applications, and on average, each would need about 3 hours of manufacturer engineer time. CARB staff estimates an average hourly rate for manufacturer engineers of \$120 based on: mean hourly wage for a mechanical engineer in May 2018 in California was \$51.62 [USBLS, 2019a], and wages for private industry 'manufacturing' as a percent of total compensation in 2019 was 65.7% [USBLS, 2019b]. CARB staff used these equation to estimate hourly rate: = $\$51.62 \div 65.7\% = \$78.57 = \$80$ (rounded to one significant digit); and to account for all overhead costs: = $\$80 + (\$80 \times 50\%) = \$120/\text{hour}$. To estimate total costs to manufacturers, CARB staff used this equation: = $3 \text{ hours per cross-reference exercise} \times 1 \text{ event per manufacturer} \times 6 \text{ manufacturers} \times \$120/\text{hour} = \$2,160$.
- **\$2,160** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for equipment manufacturers to spend time conducting a detailed cross reference of nozzle dimensions described in 10 pages of text, tables, and figures in CARB certification procedures with SAE J285 and SAE J1140 documents.
- To estimate average annual cost-savings for the manufacturers under the proposed amendments in Tables L-48 and L-52, CARB staff used this equation: = $\$2,160 \div 4 \text{ years} = \540 per year .

Business- and government-owned GDFs: Potential passed-through cost-savings from EVR and ECO nozzle manufacturers

The manufacturers could experience a total new cost-savings of about \$2,160 between 2021 and 2024 under the proposed amendments. To estimate the potential passed-through cost-

savings to each consumer (business- and government-owned GDFs with EVR or ECO nozzles), CARB staff multiplied the total costs to manufacturers by estimated mark-up and divided by the number of GDFs assumed to purchase equipment between 2022, which is likely the first year consumers might experience passed-through cost-savings for any certification efforts in 2021, and 2030.

- **60 percent** – Potential manufacturer mark-up. CARB staff estimated potential manufacturer mark-up using this equation: $\text{Profit margin} \div (1 - \text{Profit margin}) = 37.5\% \div (1 - 37.5\%) = 60\%$. This calculation assumes equipment manufacturers fully pass on costs and change equipment prices to maintain a constant profit margin. (Section C provides additional information about the mark-up estimate.)
- **\$1.79** – Potential passed-through cost-savings per GDF. If manufacturers were to pass on all cost-savings along with an estimated 60 percent mark-up, this would result in \$3,456 ($\$2,160 \times 1.6$) in cost-savings to California GDF owners over the lifetime of the regulation. If all GDFs that purchase EVR or ECO nozzles are impacted by passed-through cost-savings, this could result in approximately \$0.31 in cost-savings per GDF ($\$3,456 \div 11,148$ impacted GDFs, including federally-owned GDFs, which are not included in the cost tables) during the 2022-2030 period, or an average of \$0.03 per year per GDF ($\$0.31 \div 9$ years). These potential passed-through costs are considered to be negligible both discretely and cumulatively when summed with other potential passed-through costs and savings that may result from all the proposed amendments (Table L-49).

5. Replace placeholder language with the actual date for effective dates in Table 2-1 in CP-206

This proposed amendment provides a specific operative and effective date, 'March 13, 2015', in Table 2-1 in CP-206 and removes placeholder language. Table 2-1 lists the effective and operative dates for the standards and specifications for each requirement for ASTs. When no vapor recovery system has yet been certified that meets the requirements listed in Table 2-1, the placeholder text "when first system is certified" is used instead of specific dates. In the rows for "ORVR Compatibility," "Nozzle Criteria," "Liquid Retention Nozzle Spitting," and "All other Phase II Standards and Specifications", there is placeholder language. Given a Phase II EVR system was certified on March 13, 2015 that meets the requirements, the placeholder text could be confusing for users (e.g., equipment manufacturers who intend to apply for CARB certification or certification renewal). It is common CARB practice that once CARB certifies a system or component, then the date of certification is included the next time the certification procedure is amended. The proposed amendment does not introduce any new requirements for regulated entities (GDF owners) nor regulating agencies.

CARB staff identified two types of direct costs under BAU that the proposed amendment would eliminate: (1) the placeholder language can create confusion for equipment manufacturers and cost them time to research the dates and ultimately contact CARB staff

for clarification; and (2) time needed by CARB staff to provide responses. The itemized list below provides an explanation of the methodology and staff assumptions used in quantifying the potential costs and cost-savings for manufacturers and CARB, and potential passed-through cost-savings to consumers (owners of GDFs with ASTs who purchase vapor recovery equipment).

Vapor recovery equipment manufacturers: Time needed to research requirements for certification applications

There are currently four manufacturers that produce Phase II vapor recovery equipment for GDFs with ASTs already certified by CARB for sale in California: EMCO, Hirt, Veyance, and VST. One of the manufacturers is based in California, and it meets the definition of a small business.

- **\$480** cost under BAU (\$120 per manufacturer) – Total cost under BAU for manufacturers over 10 years (2021-2030) to obtain clarification (e.g., via email or telephone) about effective and operative dates. This estimate is based on the assumptions that each manufacturer would twice seek clarification of the effective/operative date from CARB staff over 10 years, and on average, each clarification event would need 0.5 hour of manufacturer engineer time. CARB staff estimates an average hourly rate for manufacturer engineers of \$120 based on: mean hourly wage for a mechanical engineer in May 2018 in California was \$51.62 [USBLS, 2019a], and wages for private industry 'manufacturing' as a percent of total compensation in 2019 was 65.7% [USBLS, 2019b]. CARB staff used these equation to estimate hourly rate: = $\$51.62 \div 65.7\% = \$78.57 = \$80$ (rounded to one significant digit); and to account for all overhead costs: = $\$80 + (\$80 \times 50\%) = \$120/\text{hour}$. To estimate total costs to manufacturers, CARB staff used this equation: = $0.5 \text{ hour per clarification event} \times 2 \text{ events per manufacturer} \times 4 \text{ manufacturers} \times \$120/\text{hour} = \$480$.
- **\$480** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for manufacturers to spend time seeking clarification from CARB staff.
- To estimate average annual cost-savings for the manufacturers under the proposed amendments in Tables L-48 and L-52, CARB staff used these equations:
 - Small California business: $1 \text{ manufacturer} \times \$120 \div 10 \text{ years} = \12 per year .
 - Non-California businesses: $3 \text{ manufacturers} \times \$120 \div 10 \text{ years} = \36 per year .

CARB: Time needed to respond to questions from equipment manufacturers as they research requirements for certification applications

There are currently four manufacturers that produce Phase II vapor recovery equipment for GDFs with ASTs already certified by CARB for sale in California: EMCO, Hirt, Veyance, and VST.

- **\$380** cost under BAU – Total cost under BAU for CARB over 10 years (2021-2030) to provide clarification (e.g., via email or telephone) about effective and operative dates. This estimate is based on the assumptions that each manufacturer would twice seek clarification of the effective/operative date from CARB staff over 10 years, and on average, each clarification event would need 0.5 hour of CARB staff time. To estimate total costs to CARB, CARB staff used this equation: = 0.5 hour per clarification event x 2 events per manufacturer x 4 manufacturers x \$95/hour = \$380.
- **\$380** cost-savings under proposed amendments. The proposed amendments result in cost-savings because they eliminate the need for manufacturers to spend time seeking clarification from CARB staff.
- To estimate average annual cost-savings for CARB under the proposed amendments in Tables L-62 and L-64, CARB staff used this equation: = \$380 ÷ 10 years = \$38 per year.

Business- and government-owned GDFs: Potential passed-through cost-savings from equipment manufacturers

Equipment manufacturers could experience a total new cost-savings of about \$480 between 2021 and 2030 under the proposed amendments. To estimate the potential passed-through cost-savings to each consumer (business- and government-owned GDFs with ASTs and Phase II EVR systems), CARB staff multiplied the total costs to manufacturers by estimated mark-up and divided by the number of GDFs assumed to purchase equipment between 2022, which is likely the first year consumers might experience passed-through cost-savings for any certification efforts in 2021, and 2030.

- **60 percent** – Potential manufacturer mark-up. CARB staff estimated potential manufacturer mark-up using this equation: = Profit margin ÷ (1 - Profit margin) = 37.5% ÷ (1 - 37.5%) = 60%. This calculation assumes equipment manufacturers fully pass on costs and change equipment prices to maintain a constant profit margin. (Section C provides additional information about the mark-up estimate.)
- **\$2.39** – Potential passed-through cost-savings per GDF. If manufacturers were to pass on all cost-savings along with an estimated 60 percent mark-up, this would result in \$768 (\$480 x 1.6) in cost-savings to California GDF owners over the lifetime of the regulation. If all GDFs that purchase ECO nozzles are impacted by passed-through cost-savings, this could result in approximately \$4.11 in cost-savings per GDF (\$768 ÷ 187 impacted GDFs, including federally-owned GDFs, which are not included in the cost tables) during the 2022-2030 period, or an average of \$0.46 per year per GDF (\$4.11 ÷ 9 years). These potential passed-through costs are considered to be negligible both discretely and cumulatively when summed with other potential passed-through costs and savings that may result from all the proposed amendments (Table L-49).

I. COST SUMMARY TABLES

The following tables provide statewide summaries of estimated direct and indirect costs and cost savings under the proposed amendments and Alternative 2 compared to costs under current regulations. These sums describe the annual and regulatory lifetime economic and fiscal impacts that could result from implementation of the proposed amendments and Alternative 2.

1. Proposed amendments compared to Alternative 1 (BAU, current regulations)

a. Businesses active in California

Table L-48a: Estimated difference in direct costs of proposed amendments compared to BAU ^[a] for businesses active in California, including only required actions [same as Table 4a in Chapter VIII]

Year	Business-Owned GDFs		Equipment Manufacturers		TOTAL	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021	\$0	\$0	\$81,428	(\$717)	\$81,428	(\$717)
2022	\$0	\$0	\$144,791	(\$860)	\$144,791	(\$860)
2023	\$1,802	\$0	\$12,579	(\$4,627)	\$14,380	(\$4,627)
2024	\$3,603	(\$1,143,303)	\$12,551	(\$4,617)	\$16,154	(\$1,147,920)
2025	\$5,396	(\$2,281,633)	\$12,333	(\$4,067)	\$17,728	(\$2,285,700)
2026	\$7,179	(\$3,419,963)	\$12,277	(\$4,047)	\$19,455	(\$3,424,010)
2027	\$8,962	(\$4,558,293)	\$12,277	(\$4,047)	\$21,238	(\$4,562,340)
2028	\$8,943	(\$5,696,623)	\$12,277	(\$4,047)	\$21,220	(\$5,700,670)
2029	\$8,925	(\$6,834,953)	\$12,277	(\$4,047)	\$21,201	(\$6,839,000)
2030	\$8,916	(\$7,964,256)	\$12,249	(\$4,037)	\$21,164	(\$7,968,293)
Total:	\$53,725	(\$31,899,024)	\$325,035	(\$35,113)	\$378,759	(\$31,934,137)

[a] BAU: Business as usual scenario, which describes conditions under baseline (existing) regulations in the absence of the proposed amendments. Costs under BAU must be estimated as though Advisory 405 is not in place because Advisory 405 is not a regulation.

Table L-48b: Estimated difference in direct costs of proposed amendments compared to BAU for businesses active in California, including required and voluntary actions [same as Table 4b in Chapter VIII]

Year	Business-Owned GDFs		Equipment Manufacturers		TOTAL	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021	\$0	\$0	\$81,428	(\$717)	\$81,428	(\$717)
2022	\$0	\$0	\$144,791	(\$860)	\$144,791	(\$860)
2023	\$553,680	\$0	\$693,592	(\$4,627)	\$1,247,271	(\$4,627)
2024	\$1,106,645	(\$4,647,849)	\$694,445	(\$4,617)	\$1,801,090	(\$4,652,466)
2025	\$1,659,602	(\$9,290,725)	\$694,227	(\$4,067)	\$2,353,828	(\$9,294,792)
2026	\$2,211,835	(\$13,933,601)	\$691,528	(\$4,047)	\$2,903,363	(\$13,937,648)
2027	\$2,213,618	(\$18,561,767)	\$12,277	(\$4,047)	\$2,225,895	(\$18,565,814)
2028	\$1,661,722	(\$19,700,097)	\$12,277	(\$4,047)	\$1,673,998	(\$19,704,144)
2029	\$1,110,539	(\$20,838,427)	\$12,277	(\$4,047)	\$1,122,816	(\$20,842,474)
2030	\$559,366	(\$21,967,730)	\$12,249	(\$4,037)	\$571,614	(\$21,971,767)
Total:	\$11,077,006	(\$108,940,196)	\$3,049,087	(\$35,113)	\$14,126,093	(\$108,975,309)

Table L-49: Potential distributional (passed-through) impact for individual GDFs under the proposed amendments based on type of vapor recovery equipment summed over the entire project period (2021-2030)

Proposed Amendment	GDFs with ASTs and Phase I EVR	GDFs with ASTs and Phase II EVR	GDFs with USTs and Phase II EVR	GDFs with USTs and Phase II EVR and predicted to purchase a new ISD console during 2023-2030	GDFs with ECO nozzles / low permeation hoses
ISD communication port	na^	na	na	(\$16.07)	na
Nozzle spillage standard	na	na	\$0.10	\$0.10	\$0.10
Equipment archive	\$1.58	\$1.58	\$1.58	\$1.58	\$1.58
CP-207 effective date	na	na	na	na	(\$2.39)
CP-207 Introduction	na	na	na	na	(\$1.79)
Amend CP-201 title	(\$0.05)	(\$0.05)	(\$0.05)	(\$0.05)	na
Nozzle dimensions	na	na	(\$0.31)	(\$0.31)	(\$0.31)
CP-206 effective date	na	(\$4.11)	na	na	na
Total per GDF by vapor recovery equipment type	\$1.53	(\$2.58)	\$1.31	(\$14.76)	(\$2.81)

^ na: not applicable

Table L-50a: Estimated difference in indirect impacts of proposed amendments compared to BAU for businesses, including only required actions

Year	Equipment Manufacturers		Service Contractors	
	Costs Only	Revenue Increases Only	Revenue Decreases Only	Revenue Increases Only
2021	\$0	\$0	\$0	\$0
2022	\$0	\$0	\$0	\$0
2023	\$0	(\$7,820)	\$0	\$0
2024	\$0	(\$7,800)	\$1,103,884	\$0
2025	\$0	(\$7,780)	\$2,198,486	\$0
2026	\$0	(\$7,740)	\$3,294,813	\$0
2027	\$0	(\$7,740)	\$4,393,915	\$0
2028	\$0	(\$7,740)	\$5,493,017	\$0
2029	\$0	(\$7,740)	\$6,589,344	\$0
2030	\$0	(\$7,720)	\$7,675,266	\$0
Total:	\$0	(\$62,080)	\$30,748,725	\$0

Table L-50b: Estimated difference in indirect impacts of proposed amendments compared to BAU for businesses, including required and voluntary actions

Year	Equipment Manufacturers		Service Contractors	
	Costs Only	Revenue Increases Only	Revenue Decreases Only	Revenue Increases Only
2021	\$0	\$0	\$0	\$0
2022	\$0	\$0	\$0	\$0
2023	\$0	(\$1,097,750)	\$0	(\$1,059,010)
2024	\$0	(\$1,099,140)	\$4,473,679	(\$1,060,380)
2025	\$0	(\$1,099,120)	\$8,947,676	(\$1,060,380)
2026	\$0	(\$1,094,850)	\$13,418,148	(\$1,056,270)
2027	\$0	(\$7,740)	\$17,872,900	\$0
2028	\$0	(\$7,740)	\$18,972,002	\$0
2029	\$0	(\$7,740)	\$20,068,329	\$0
2030	\$0	(\$7,720)	\$21,154,251	\$0
Total:	\$0	(\$4,421,800)	\$104,906,985	(\$4,236,040)

Table L-51: Estimated difference in direct costs of proposed amendments compared to BAU for businesses-owned GDFs for each proposed amendment ^[a]

Year	A. Estimated potential costs for GDFs required to install updated ISD software			B. Estimated potential maximum costs for GDFs that voluntarily install updated ISD software		
	Alarm Response Costs	Permit Costs	Capital & Installation Costs	Alarm Response Costs	Permit Costs	Capital & Installation Costs
2021	\$0	\$0	\$0	\$0	\$0	\$0
2022	\$0	\$0	\$0	\$0	\$0	\$0
2023	\$0	\$0	\$1,802	\$0	\$55,527	\$496,351
2024	(\$1,143,303)	\$0	\$3,603	(\$3,504,546)	\$110,982	\$992,060
2025	(\$2,281,633)	\$0	\$5,396	(\$7,009,092)	\$166,437	\$1,487,769
2026	(\$3,419,963)	\$0	\$7,179	(\$10,513,638)	\$221,821	\$1,982,835
2027	(\$4,558,293)	\$0	\$8,962	(\$14,003,474)	\$221,821	\$1,982,835
2028	(\$5,696,623)	\$0	\$8,943	(\$14,003,474)	\$166,294	\$1,486,485
2029	(\$6,834,953)	\$0	\$8,925	(\$14,003,474)	\$110,839	\$990,776
2030	(\$7,964,256)	\$0	\$8,916	(\$14,003,474)	\$55,383	\$495,067
Total:	(\$31,899,024)	\$0	\$53,725	(\$77,041,172)	\$1,109,104	\$9,914,177

[a] Only the proposed amendments to the ISD software requirements have a direct impact on business-owned GDFs.

Table L-52: Estimated difference in direct costs of proposed amendments compared to BAU for equipment manufacturers for each proposed amendment

Year	Updated ISD software: Required actions ^[a]	Updated ISD software: Voluntary GDF actions ^[b]	ISD RS-232 port	Amend nozzle spillage standards	Equipment archive	Update CP-207 effective dates	Clarify CP-207 Introduction	Amend CP-201 title	Amend nozzle dimensions reference	Update CP-206 effective date
2021	\$79,892	\$0	\$0	\$95	\$1,441	(\$48)	(\$36)	(\$45)	(\$540)	(\$48)
2022	\$143,160	\$0	(\$143)	\$190	\$1,441	(\$48)	(\$36)	(\$45)	(\$540)	(\$48)
2023	\$10,948	\$681,013	(\$3,910)	\$190	\$1,441	(\$48)	(\$36)	(\$45)	(\$540)	(\$48)
2024	\$10,920	\$681,894	(\$3,900)	\$190	\$1,441	(\$48)	(\$36)	(\$45)	(\$540)	(\$48)
2025	\$10,892	\$681,894	(\$3,890)	\$0	\$1,441	(\$48)	(\$36)	(\$45)	\$0	(\$48)
2026	\$10,836	\$679,251	(\$3,870)	\$0	\$1,441	(\$48)	(\$36)	(\$45)	\$0	(\$48)
2027	\$10,836	\$0	(\$3,870)	\$0	\$1,441	(\$48)	(\$36)	(\$45)	\$0	(\$48)
2028	\$10,836	\$0	(\$3,870)	\$0	\$1,441	(\$48)	(\$36)	(\$45)	\$0	(\$48)
2029	\$10,836	\$0	(\$3,870)	\$0	\$1,441	(\$48)	(\$36)	(\$45)	\$0	(\$48)
2030	\$10,808	\$0	(\$3,860)	\$0	\$1,441	(\$48)	(\$36)	(\$45)	\$0	(\$48)
Total:	\$309,964	\$2,724,052	(\$31,183)	\$665	\$14,406	(\$480)	(\$360)	(\$450)	(\$2,160)	(\$480)

[a] ISD manufacturer costs associated with development and certification of updated ISD software, and production of software updates for ISD consoles predicted to be purchased for new GDFs and GDFs that undergo major modifications.

[b] ISD manufacturer costs associated with production of updated ISD software for voluntary installation at existing GDFs.

Table L-53a: Estimated difference in indirect impacts of proposed amendments compared to BAU on service contractors^[a]

Year	A. Potential impacts resulting from GDFs <u>required</u> to install updated ISD software		B. Potential impacts resulting from GDFs that <u>voluntarily</u> install updated ISD software	
	Revenue Increases for ISD Software Installation	Revenue Decreases for Alarm Response	Revenue Increases for ISD Software Installation	Revenue Decreases for Alarm Response
2021	\$0	\$0	\$0	\$0
2022	\$0	\$0	\$0	\$0
2023	\$0	\$0	(\$1,059,010)	\$0
2024	\$0	\$1,103,884	(\$1,060,380)	\$3,369,795
2025	\$0	\$2,198,486	(\$1,060,380)	\$6,749,190
2026	\$0	\$3,294,813	(\$1,056,270)	\$10,123,335
2027	\$0	\$4,393,915	\$0	\$13,478,985
2028	\$0	\$5,493,017	\$0	\$13,478,985
2029	\$0	\$6,589,344	\$0	\$13,478,985
2030	\$0	\$7,675,266	\$0	\$13,478,985
Total:	\$0	\$30,748,725	(\$4,236,040)	\$74,158,260

[a] Only the proposed amendments to the ISD software requirements are expected to have any impact on service contractors.

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Table L-53b: Estimated difference in indirect impacts of proposed amendments compared to BAU on ISD manufacturers

Year	A. Potential revenue increase resulting from GDFs <u>required</u> to install updated ISD software	B. Potential revenue increase resulting from GDFs that <u>voluntarily</u> install updated ISD software	Total Potential Revenue Increase
2021	\$0	\$0	\$0
2022	\$0	\$0	\$0
2023	(\$7,820)	(\$1,089,930)	(\$1,097,750)
2024	(\$7,800)	(\$1,091,340.00)	(\$1,099,140)
2025	(\$7,780)	(\$1,091,340.00)	(\$1,099,120)
2026	(\$7,740)	(\$1,087,110.00)	(\$1,094,850)
2027	(\$7,740)	\$0.00	(\$7,740)
2028	(\$7,740)	\$0.00	(\$7,740)
2029	(\$7,740)	\$0.00	(\$7,740)
2030	(\$7,720)	\$0.00	(\$7,720)
Total:	(\$62,080)	(\$4,359,720)	(\$4,421,800)

[a] The proposed amendments to the ISD software requirements are expected to have an indirect impact on revenue for ISD manufacturers.

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Table L-54: Estimated difference in direct costs of proposed amendments compared to BAU by business sector and business size through 2030

Category	Total Costs Only	Total Cost-Savings Only	Net Difference	Total Costs as Percent of All Businesses in Category	Total Cost-Savings as Percent of All Businesses in Category
Gasoline Dispensing Facilities - Required Actions					
All businesses	\$53,725	(\$31,899,024)	(\$31,845,299)	--	--
Businesses based in California	\$36,564	(\$21,312,013)	(\$21,275,449)	68%	67%
California small businesses	\$12,865	(\$6,691,854)	(\$6,678,989)	24%	21%
Gasoline Dispensing Facilities – Required & Voluntary Actions (potential maximum)					
All businesses	\$11,077,006	(\$108,940,196)	(\$97,863,190)	--	--
Businesses based in California	\$10,158,778	(\$92,170,608)	(\$82,011,831)	92%	85%
California small businesses	\$8,890,748	(\$69,012,606)	(\$60,121,858)	80%	63%
Manufacturers – Includes potential ISD manufacturer production costs associated with potential required and voluntary GDF actions					
All businesses	\$325,035 to \$3,049,087	(\$35,113)	\$289,922 to \$3,013,974	--	--
Businesses based in California	\$0	(\$180)	(\$180)	0%	<1%
California small businesses	\$0	(\$150)	(\$150)	0%	0%
Total for All Businesses - Required Actions Only					
All businesses	\$378,759	(\$31,934,137)	(\$31,555,377)	--	--
Businesses based in California	\$36,564	(\$21,312,193)	(\$21,275,629)	10%	67%
California small businesses	\$12,865	(\$6,692,004)	(\$6,679,139)	3%	21%
Total for All Businesses - Required & Voluntary Actions (potential maximum)					
All businesses	\$14,126,093	(\$108,975,309)	(\$94,849,216)	--	--
Businesses based in California	\$10,158,778	(\$92,170,788)	(\$82,012,011)	72%	85%
California small businesses	\$8,890,748	(\$69,012,756)	(\$60,122,008)	63%	63%

b. Local government

Table L-55: Estimated difference in direct costs of proposed amendments compared to BAU for local government, including potential required and voluntary actions [same as Table 7 in Chapter VIII]

Period / Agency	Costs Only	Cost-Savings Only	Net	Net: Only Non-reimbursable and Non-recoverable Costs
Local agencies that operate gasoline dispensing facilities: [a]				
FY2021/22:	\$0	\$0	\$0	\$0
FY2022/23:	\$0	\$0	\$0	\$0
FY2023/24:	\$0	\$0	\$0	\$0
Lifetime:	\$6,200 [a]	(\$63,500)	(\$57,300)	(\$57,300)
Air Districts: [a]				
FY2021/22:	\$7,200	(\$115)	\$7,100	(\$115)
FY2022/23:	\$4,000 [a]	(\$115)	\$3,900	\$3,900
FY2023/24:	\$18,700	(\$115)	\$18,600	(\$115)
Lifetime:	\$86,000	(\$1,100)	\$85,000	\$2,900
Certified Unified Program Agencies: [a]				
FY2021/22:	\$0	\$0	\$0	\$0
FY2022/23:	\$0	\$0	\$0	\$0
FY2023/24:	\$221,000	\$0	\$221,000	\$0
Lifetime:	\$886,000	\$0	\$886,000	\$0
All Local Agencies: [a]				
FY2021/22:	\$7,200	(\$115)	\$7,100	(\$115)
FY2022/23:	\$4,000	(\$115)	\$3,900	\$3,900
FY2023/24:	\$239,700	(\$115)	\$239,600	(\$115)
Lifetime:	\$978,200	(\$64,600)	\$913,600	(\$54,400)

[a] Approximately \$4,000 in costs for Air Districts cannot be recovered from manufacturers and GDF owners applying for permits nor reimbursed from the State, and about \$6,200 in costs for local agencies that operate GDFs are not reimbursable. All other costs for Air Districts and CUPAs are fully recovered from GDF owners applying for permits because Air Districts and CUPAs have legal authority under state law to recover related costs by imposing fees. Of the total statewide costs of \$978,200, \$968,000 are recoverable through permit fees. As a result, the proposed amendments result in a net statewide cost-savings of about \$54,400 through 2030 (i.e., \$10,200 costs + \$64,600 cost-savings = \$54,400 net savings).

Table L-56: Estimated difference in direct costs of proposed amendments compared to BAU for local agencies that own GDFs

Fiscal Year	A. Estimated potential costs for GDFs <u>required</u> to install updated ISD software		B. Estimated potential maximum costs for both <u>required</u> and <u>voluntary</u> installations of updated ISD software	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021/22	\$0	\$0	\$0	\$0
2022/23	\$0	\$0	\$0	\$0
2023/24	\$0	\$0	\$0	\$0
2024/25	\$0	\$0	\$3,091	\$0
2025/26	\$0	\$0	\$3,091	(\$4,992)
2026/27	\$20	\$0	\$20	(\$7,254)
2027/28	\$0	(\$4,680)	\$0	(\$11,934)
2028/29	\$20	(\$4,680)	\$20	(\$11,934)
2029/30	\$0	(\$6,474)	\$0	(\$13,728)
2030/31	\$0	(\$6,474)	\$0	(\$13,728)
Total:	\$40	(\$22,308)	\$6,222	(\$63,570)

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Table L-57a: Estimated difference in direct costs of proposed amendments compared to BAU for Air Districts – FY2021/22 through FY2023/24

Fiscal Year	A. All Costs		B. Non-reimbursable and Non-Recoverable Costs	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021/22	\$7,200	(\$115)	\$0	(\$115)
2022/23	\$4,000	(\$115)	\$4,000	(\$115)
2023/24	\$18,700	(\$115)	\$0	(\$115)
Total:	\$29,900	(\$345)	\$4,000	(\$345)

Table L-57b: Estimated difference in direct costs of proposed amendments compared to BAU for Air Districts – Lifetime costs

Fiscal Year	A. All Costs		B. Non-reimbursable and Non-Recoverable Costs	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021/22	\$7,200	(\$115)	\$0	(\$115)
2022/23	\$4,000	(\$115)	\$4,000	(\$115)
2023/24	\$18,700	(\$115)	\$0	(\$115)
2024/25	\$18,700	(\$115)	\$0	(\$115)
2025/26	\$18,700	(\$115)	\$0	(\$115)
2026/27	\$18,700	(\$115)	\$0	(\$115)
2027/28	\$0	(\$115)	\$0	(\$115)
2028/29	\$0	(\$115)	\$0	(\$115)
2029/30	\$0	(\$115)	\$0	(\$115)
2030/31	\$0	(\$58)	\$0	(\$58)
Total:	\$86,000	(\$1,100)	\$4,000	(\$1,100)

Table L-58a: Estimated difference in direct costs of proposed amendments compared to BAU for CUPAs – FY2021/22 through FY2023/24

Fiscal Year	A. All Costs		B. Non-reimbursable and Non-Recoverable Costs	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021/22	\$0	\$0	\$0	\$0
2022/23	\$0	\$0	\$0	\$0
2023/24	\$221,000	\$0	\$0	\$0
Total:	\$221,000	\$0	\$0	\$0

Table L-58b: Estimated difference in direct costs of proposed amendments compared to BAU for CUPAs – Lifetime costs

Fiscal Year	A. All Costs		B. Non-reimbursable and Non-Recoverable Costs	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021/22	\$0	\$0	\$0	\$0
2022/23	\$0	\$0	\$0	\$0
2023/24	\$221,000	\$0	\$0	\$0
2024/25	\$222,000	\$0	\$0	\$0
2025/26	\$222,000	\$0	\$0	\$0
2026/27	\$221,000	\$0	\$0	\$0
2027/28	\$0	\$0	\$0	\$0
2028/29	\$0	\$0	\$0	\$0
2029/30	\$0	\$0	\$0	\$0
2030/31	\$0	\$0	\$0	\$0
Total:	\$886,000	\$0	\$0	\$0

Table L-59: Estimated difference in direct costs of proposed amendments compared to BAU for GDFs owned by local agencies^[a]

Fiscal Year	A. Estimated potential costs for GDFs <u>required</u> to install updated ISD software			B. Estimated potential maximum costs for GDFs that <u>voluntarily</u> install updated ISD software		
	Alarm Response Costs	Permit Costs	Capital & Installation Costs	Alarm Response Costs	Permit Costs	Capital & Installation Costs
2021/22	\$0	\$0	\$0	\$0	\$0	\$0
2022/23	\$0	\$0	\$0	\$0	\$0	\$0
2023/24	\$0	\$0	\$0	\$0	\$0	\$0
2024/25	\$0	\$0	\$0	\$0	\$311	\$2,780
2025/26	\$0	\$0	\$0	(\$4,992)	\$311	\$2,780
2026/27	\$0	\$0	\$20	(\$7,254)	\$0	\$0
2027/28	(\$4,680)	\$0	\$0	(\$7,254)	\$0	\$0
2028/29	(\$4,680)	\$0	\$20	(\$7,254)	\$0	\$0
2029/30	(\$6,474)	\$0	\$0	(\$7,254)	\$0	\$0
2030/31	(\$6,474)	\$0	\$0	(\$7,254)	\$0	\$0
Total:	(\$22,308)	\$0	\$40	(\$41,262)	\$622	\$5,560

[a] Only the proposed amendments to the ISD software requirements have a direct impact on government-owned GDFs.

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Table L-60: Estimated difference in direct costs of proposed amendments compared to BAU for Air Districts for each proposed amendment

Fiscal Year	Updated ISD software: Permitting costs for ISD manufacturer test sites [Costs recovered from manufacturers]	Updated ISD software: Costs to review draft certification Executive Orders [Costs not reimbursable and not recoverable]	Updated ISD software: Permitting costs related to <u>required</u> installations for GDFs [Costs recovered from GDF owners]	Updated ISD software: Permitting costs related to <u>voluntary</u> installations for GDFs [Costs recovered from GDF owners]	Amend CP-206 for date of 'existing' ASTs for Phase II upgrade [Cost-savings]
2021/22	\$7,200	\$0	\$0	\$0	(\$115)
2022/23	\$0	\$4,000	\$0	\$0	(\$115)
2023/24	\$0	\$0	\$0	\$18,700	(\$115)
2024/25	\$0	\$0	\$0	\$18,700	(\$115)
2025/26	\$0	\$0	\$0	\$18,700	(\$115)
2026/27	\$0	\$0	\$0	\$18,700	(\$115)
2027/28	\$0	\$0	\$0	\$0	(\$115)
2028/29	\$0	\$0	\$0	\$0	(\$115)
2029/30	\$0	\$0	\$0	\$0	(\$115)
2030/31	\$0	\$0	\$0	\$0	(\$58)
Total:	\$7,200	\$4,000	\$0	\$74,800	(\$1,100)

Table L-61: Estimated difference in direct costs of proposed amendments compared to BAU for CUPAs for each proposed amendment ^[a]

Fiscal Year	Updated ISD software: Permitting costs related to <u>required</u> installations for GDFs [Costs recovered from GDF owners]	Updated ISD software: Permitting costs related to <u>voluntary</u> installations for GDFs [Costs recovered from GDF owners]
2021/22	\$0	\$0
2022/23	\$0	\$0
2023/24	\$0	\$221,000
2024/25	\$0	\$222,000
2025/26	\$0	\$222,000
2026/27	\$0	\$221,000
2027/28	\$0	\$0
2028/29	\$0	\$0
2029/30	\$0	\$0
2030/31	\$0	\$0
Total:	\$0	\$886,000

[a] Only the proposed amendments to the ISD software requirements have a direct impact on CUPAs.

c. State government

Table L-62: Estimated difference in direct costs of proposed amendments compared to BAU for state government ^[a] [same as Table 9 in Chapter VIII]

Period / Agency	Costs Only	Cost-Savings Only ^[b]	Net	Net: Only Non-recoverable Costs
California Air Resources Board: ^[a]				
FY2021/22:	\$2,530	(\$370)	\$2,160	(\$210)
FY2022/23:	\$64,410	(\$230)	\$64,180	(\$210)
FY2023/24:	\$300	(\$230)	\$70	(\$210)
Lifetime:	\$68,510	(\$2,320)	\$66,190	(\$1,990)
Department of Forestry and Fire Protection SFM:				
FY2021/22:	\$0	\$0	\$0	\$0
FY2022/23:	\$170	\$0	\$170	\$0
FY2023/24:	\$0	\$0	\$0	\$0
Lifetime:	\$170	\$0	\$170	\$0
Department of Industrial Relations DOSH:				
FY2021/22:	\$0	\$0	\$0	\$0
FY2022/23:	\$480	\$0	\$480	\$0
FY2023/24:	\$0	\$0	\$0	\$0
Lifetime:	\$480	\$0	\$480	\$0
All State Agencies:				
FY2021/22:	\$2,530	(\$370)	\$2,160	(\$210)
FY2022/23:	\$65,060	(\$230)	\$64,820	(\$210)
FY2023/24:	\$300	(\$230)	\$70	(\$210)
Lifetime:	\$69,160	(\$2,320)	\$66,840	(\$1,990)

[a] CARB is the only state agency anticipated to have non-recoverable costs under the proposed amendments (i.e., costs of \$22/year and cost-savings of \$230/year, for a net cost-savings (rounded) of \$210/year).

[b] Parentheses indicate cost-savings.

Table L-63: Estimated difference in direct costs of proposed amendments compared to BAU for Department of Forestry and Fire Protection SFM and Department of Industrial Relations DOSH – FY2021/22 through FY2023/24

Fiscal Year	Department of Forestry and Fire Protection SFM ^[a]		Department of Industrial Relations DOSH ^[a]	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021/22	\$0	\$0	\$0	\$0
2022/23	\$170	\$0	\$480	\$0
2023/24	\$0	\$0	\$0	\$0
Total:	\$170	\$0	\$480	\$0

[a] Only the proposed amendments to the ISD software requirements have an impact on these state agencies. The only costs under the proposed amendments for these agencies are expected to occur in FY2022/23. All costs are recoverable from ISD manufacturers and therefore would not have any fiscal impact on these agencies.

Table L-64: Estimated difference in direct costs of proposed amendments compared to BAU for CARB – FY2021/22 through FY2023/24

Fiscal Year	A. All Costs		B. Non-recoverable Costs	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021/22	\$2,530	(\$370)	\$22	(\$230)
2022/23	\$64,410	(\$230)	\$22	(\$230)
2023/24	\$300	(\$230)	\$22	(\$230)
Total:	\$67,240	(\$830)	\$66	(\$690)

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Table L-65: Estimated difference in direct costs of proposed amendments compared to BAU for CARB – Lifetime costs

Fiscal Year	A. All Costs		B. Non-recoverable Costs	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021/22	\$2,530	(\$370)	\$22	(\$230)
2022/23	\$64,410	(\$230)	\$22	(\$230)
2023/24	\$300	(\$230)	\$22	(\$230)
2024/25	\$310	(\$230)	\$22	(\$230)
2025/26	\$240	(\$230)	\$22	(\$230)
2026/27	\$190	(\$230)	\$22	(\$230)
2027/28	\$150	(\$230)	\$22	(\$230)
2028/29	\$130	(\$230)	\$22	(\$230)
2029/30	\$130	(\$230)	\$22	(\$230)
2030/31	\$120	(\$110)	\$11	(\$110)
Total:	\$68,510	(\$2,300)	\$209	(\$2,200)

Table L-66: Estimated difference in direct costs of proposed amendments compared to BAU for CARB for each proposed amendment

Fiscal Year	Updated ISD Software: Certification Costs ^[a]	ISD RS-232 port: Certification Costs ^[a]	Amend nozzle spillage standard: Certification Costs ^[a]	Equipment archive: Storage Costs ^[a]	Equipment archive: Storage Costs ^[b]	Amend CP-206 for date of 'existing' ASTs for Phase II upgrade ^[b]	Update CP-207 effective date ^[b]	Clarify CP-207 Introduction ^[b]	Amend CP-201 title ^[b]	Update CP-206 effective date ^[b]
2021/22	\$0	(\$142.50)	\$166.25	\$2,310	\$22	(\$87.50)	(\$38)	(\$28.50)	(\$35.63)	(\$38)
2022/23	\$64,110	\$0	\$166.25	\$110	\$22	(\$87.50)	(\$38)	(\$28.50)	(\$35.63)	(\$38)
2023/24	\$0	\$0	\$166.25	\$110	\$22	(\$87.50)	(\$38)	(\$28.50)	(\$35.63)	(\$38)
2024/25	\$0	\$0	\$166.25	\$110	\$22	(\$87.50)	(\$38)	(\$28.50)	(\$35.63)	(\$38)
2025/26	\$0	\$0	\$0	\$110	\$22	(\$87.50)	(\$38)	(\$28.50)	(\$35.63)	(\$38)
2026/27	\$0	\$0	\$0	\$110	\$22	(\$87.50)	(\$38)	(\$28.50)	(\$35.63)	(\$38)
2027/28	\$0	\$0	\$0	\$110	\$22	(\$87.50)	(\$38)	(\$28.50)	(\$35.63)	(\$38)
2028/29	\$0	\$0	\$0	\$110	\$22	(\$87.50)	(\$38)	(\$28.50)	(\$35.63)	(\$38)
2029/30	\$0	\$0	\$0	\$110	\$22	(\$87.50)	(\$38)	(\$28.50)	(\$35.63)	(\$38)
2030/31	\$0	\$0	\$0	\$110	\$11	(\$43.75)	(\$19)	(\$14.25)	(\$17.82)	(\$19)
Total:	\$64,110	(\$143)	\$665	\$3,300	\$209	(\$831)	(\$361)	(\$271)	(\$338)	(\$361)

[a] These costs are recovered from equipment manufacturers seeking certification.

[b] These costs are not recoverable from equipment manufacturers.

2. Alternative 2 compared to Alternative 1 (BAU)

Table L-67a: Estimated difference in direct costs of Alternative 2 compared to BAU for businesses active in California, including only required actions

Year	Business-Owned GDFs		Equipment Manufacturers		TOTAL	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021	\$0	\$0	\$135,807	(\$717)	\$135,807	(\$717)
2022	\$0	\$0	\$168,750	(\$860)	\$168,750	(\$860)
2023	\$240,161	\$0	\$12,958	(\$4,627)	\$253,119	(\$4,627)
2024	\$480,321	(\$1,181,133)	\$13,025	(\$4,617)	\$493,347	(\$1,185,750)
2025	\$719,780	(\$2,357,293)	\$12,807	(\$4,067)	\$732,587	(\$2,361,360)
2026	\$957,885	(\$3,533,259)	\$12,751	(\$4,047)	\$970,636	(\$3,537,306)
2027	\$1,195,990	(\$4,709,031)	\$12,751	(\$4,047)	\$1,208,741	(\$4,713,078)
2028	\$1,193,934	(\$5,884,803)	\$12,751	(\$4,047)	\$1,206,686	(\$5,888,850)
2029	\$1,191,878	(\$7,060,575)	\$12,751	(\$4,047)	\$1,204,630	(\$7,064,622)
2030	\$1,190,525	(\$8,227,320)	\$12,723	(\$4,037)	\$1,203,248	(\$8,231,357)
Total:	\$7,170,474	(\$32,953,414)	\$407,078	(\$35,113)	\$7,577,552	(\$32,988,527)

Table L-67b: Estimated difference in direct costs of Alternative 2 compared to BAU for businesses active in California, including required and voluntary actions

Year	Business-Owned GDFs		Equipment Manufacturers		TOTAL	
	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only	Costs Only	Cost-Savings Only
2021	\$0	\$0	\$135,807	(\$717)	\$135,807	(\$717)
2022	\$0	(\$9,065)	\$168,750	(\$860)	\$168,750	(\$9,925)
2023	\$1,389,787	(\$17,885)	\$1,475,958	(\$4,627)	\$2,865,745	(\$22,512)
2024	\$2,777,708	(\$4,528,862)	\$1,478,400	(\$4,617)	\$4,256,108	(\$4,533,479)
2025	\$4,164,926	(\$9,034,769)	\$1,478,182	(\$4,067)	\$5,643,108	(\$9,038,836)
2026	\$5,550,791	(\$13,540,482)	\$1,473,376	(\$4,047)	\$7,024,167	(\$13,544,529)
2027	\$5,788,896	(\$18,011,717)	\$12,751	(\$4,047)	\$5,801,647	(\$18,015,764)
2028	\$4,637,214	(\$19,187,489)	\$12,751	(\$4,047)	\$4,649,965	(\$19,191,536)
2029	\$3,487,398	(\$20,363,261)	\$12,751	(\$4,047)	\$3,500,150	(\$20,367,308)
2030	\$2,338,285	(\$21,530,006)	\$12,723	(\$4,037)	\$2,351,008	(\$21,534,043)
Total:	\$30,135,005	(\$106,223,536)	\$6,261,453	(\$35,113)	\$36,396,458	(\$106,258,649)

J. COMPARISON OF ALTERNATIVES 1 AND 2 TO PROPOSED AMENDMENTS

1. Summary comparison

Alternative 1 – No action

CARB staff considered not adopting any new amendments, such that ISD overpressure alarm criteria would remain as they are in the certification and test procedures. Under Alternative 1, the following conditions would continue:

- Currently, about 5,890 business-owned GDFs experience ISD overpressure alarms that can cause response costs for GDF owners. If the California Air Resources Board members do not amend the ISD software specifications in the current regulation, ISD manufacturers cannot remove the overpressure alarm criteria from the ISD software, and GDFs would continue to experience ISD overpressure alarms and incur response costs that do not reduce emissions. In the absence of Advisory 405, Alternative 1 could have up to about **\$109 million** in ISD overpressure alarm response costs through 2030 for business-owned GDFs that could be alleviated under the proposed amendments. Small businesses could be burdened by about 63 percent (**\$69.0 million**) of those alarm response costs. In addition, because ISD overpressure alarms are not effective at indicating repairable vapor recovery equipment problems, their continuation risks operator complacency toward, and accidental clearing of, remaining ISD alarms that are effective at identifying repairable problems that can lead to increased emissions.
- Reports generated and archived daily by the ISD software could continue to not report the year with report dates and pressure data with only one or no decimal point. This will continue to create confusion for GDF owners and operators, service contractors, and regulators and to make reported pressure data less useful.
- The RS-232 port would continue to be required in all ISD consoles and associated problems would continue, for example: during long data downloads, adapters often lose communication during the download; and ISD manufacturers have reported difficulty in procuring RS-232 communication modules and, when found, they prove to be costly.
- CP-201 and CP-206 would retain the spillage standard of 0.24 lbs/kgal while CP-207 would retain the more stringent spillage standard of 0.12 lbs/kgal. Alternative 1 would continue to allow unnecessary inconsistency between the three certification procedures and would not prevent the increase of emissions if manufacturers introduce inferior nozzles that comply with current performance standards.
- The continued lack of a complete physical archive of certified vapor recovery systems and components would leave CARB vulnerable to enforcement and legal problems if undisclosed changes are made to component materials or dimensional specifications that could negatively affect compliance with performance standards.
- Phase I remote fill drop tubes that are longer than 50 feet, but still vapor leak tight, would continue to fail testing under TP 201.1C and TP-201.1D, resulting in

unnecessary costs for trouble-shooting, repairs, and a loss of business when refueling the UST is no longer allowed per Air District rules, which are potential cost burdens for GDFs that do not reduce emissions.

- The incorrect Phase II EVR upgrade date for GDFs with ASTs would continue to be in the regulation. This condition would continue to create confusion for Air District enforcement staff and may result in some ASTs owners incurring unnecessary cost by having to upgrade to Phase II if the current regulations are interpreted literally.
- The administrative changes to clarify the certification and test procedures for better regulatory certainty and enforceability would not take place. Costs to manufacturers, Air Districts, and CARB associated with confusing text (and time needed to seek clarification from CARB staff), and time needed by manufacturers to cross-reference multiple standards documents, would continue.

Under Alternative 1, the potential for emissions to increase would continue. In addition, this alternative is more burdensome—less cost effective and less convenient—for businesses and regulatory agencies than the proposed amendments.

Alternative 2 – Include alternate ISD requirements, nozzle spillage standard, and equipment sample submittal requirements

Alternative 2 differs from the proposed amendments in the following ways:

1. Alternative 2 would replace the current ISD overpressure alarms with an informational report that provides site-specific pressure driven emission rates, rather than include an informational report with pressure data summaries per the proposed amendments. ISD reports with site-specific emission rates would provide a more direct method of identifying sites with elevated pressure driven emissions. However, GDFs that install the updated ISD software also would need to install a zero-leak pressure vacuum (P/V Zero) vent valve to enable calculation of site-specific pressure driven emission rates. CARB monitoring conducted in 2013, 2015, and 2018 indicates only about four percent of GDFs with ISD systems currently have P/V Zero vent valves installed [CARB, 2020b]. This means most existing GDFs that would install the updated ISD software also would need to install the P/V Zero vent valve for an additional cost. There are two other vent valves certified by CARB, but they do not allow for the vent line calculation. In addition, this alternative would require more complex ISD algorithms that would likely require several more years for field studies and engineering time to develop and for certification testing at multiple sites and, according to the ISD manufacturers, would result in a higher cost for the software update.

The higher implementation costs of the updated ISD software specifications under Alternative 2 would be borne by many GDF owners/operators required to install the more expensive software and P/V Zero valve at the time of new GDF construction or major modification of existing GDFs, and would be an increased cost burden for those businesses that own GDFs that would not have experienced overpressure alarms.

Also, CARB staff estimated that about 600 fewer GDFs may find it cost effective to voluntarily install the updated ISD software under Alternative 2 compared to the proposed amendments. As illustrated in Table L-68, Alternative 2 could have up to about **\$5 million** in additional ISD overpressure alarm response costs through 2030 for small businesses that own and operate GDFs that could be alleviated under the proposed amendments.

2. Alternative 2 would lower the nozzle spillage standard in CP-201 and CP-206 from 0.24 lbs/kgal to 0.12 lbs/kgal to align with the nozzle spillage standard listed in CP-207, rather than lower the standard in all three certification standards to 0.05 lbs/kgal per the proposed amendments. This alternative would improve the consistency between the three certification procedures and lower the nozzle standard in two of the certification procedures. This would result in lower implementation cost for Alternative 2 compared to the proposed amendments—\$380 compared to \$665—because no additional CARB certification staff time would be needed during the next ECO nozzle certification renewals. However, a standard of 0.12 lbs/kgal would be substantially higher than the performance capability of currently certified nozzles and would not prevent the increase of emissions if manufacturers introduce inferior nozzles, while still complying with the proposed 0.12 lbs/kgal standard. As a result, this alternative is not as cost-effective as the proposed amendments in achieving a key goal of the rulemaking action: to prevent emissions from increasing.
3. Alternative 2 would require manufacturers to submit physical samples of the entire certified system or component; there would be no CARB Executive Officer discretion to require submission of only sub-parts or sub-assemblies determined to be crucial in controlling emissions, per the proposed amendments. Alternative 2 would ensure archive implementation consistency over time, which is a benefit. However, this would lead to additional and likely unnecessary material and storage costs for manufacturers and CARB. For example, CARB staff anticipates the Executive Officer would not require a manufacturer to submit a Phase I EVR remote-fill system for the archive if, as indicated by informal discussions with a manufacturer, it is comprised entirely of components that are already CARB-certified. Alternative 2 would require submission of this system, which could cost the affected manufacturer approximately \$4,750 in additional certification expenses without improving regulatory and enforcement certainty. This example demonstrates Alternative 2 may not avoid unnecessary material and storage resources, and therefore is less cost-effective for manufacturers and CARB.

Under Alternative 2, the potential for emissions to increase would continue because the proposed nozzle spillage standard is substantially higher than the performance capability of currently certified nozzles and would not prevent the increase of emissions if manufacturers introduce inferior nozzles. In addition, this alternative is more burdensome—less cost effective and more inconvenient—for businesses and regulatory agencies than the proposed amendments.

D.2: Statewide costs and benefits of alternatives

Table L-68 compares the financial costs and benefits for the proposed amendments and alternatives. This comparison demonstrates the proposed amendments would provide the greatest direct cost-savings for California businesses while still achieving the goals of the proposed amendments to improve cost effectiveness, preserve the current level of air quality benefits, and clarify and improve the certification and test procedures for better regulatory certainty and enforceability. Direct cost-savings from the proposed amendments compared to Alternative 1 (No Action) could range up to about \$109.0 million through 2030. When compared to the costs, which could range up to about \$14.1 million, these savings could result in net direct cost-savings of up to about \$94.9 million. Direct cost-savings from Alternative 2 compared to Alternative 1 could range up to about \$106.3 million through 2030. When compared to the costs, which could range up to about \$36.4 million, Alternative 2 savings could result in net direct cost-savings of up to about \$69.9 million. Net cost-savings under the proposed amendments are about \$25 million higher than net cost-savings under Alternative 2. As illustrated in Table L-68, Alternative 2 would reduce overall net cost-savings for businesses active in California by about 26 percent, and net cost-savings for small California businesses by about 23 percent, compared to the proposed amendments.

No alternative was found to be less burdensome and equally effective in achieving the purposes of the regulation in a manner that ensures full compliance with the authorizing law. CARB staff has not identified any reasonable alternatives that would lessen any adverse impact on small business.

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Table L-68: Comparison of proposed amendments and Alternatives 1 and 2

Description	Proposed Amendments	Alternative 1 (current regulation)	Alternative 2
A. Address ISD Overpressure Alarm Response Costs			
# of existing and new business-owned GDFs <u>required</u> to install updated ISD software	3,098	0	3,098
Potential maximum # of existing and new business-owned GDFs anticipated to <u>voluntarily</u> install updated ISD software based on potential cost-effectiveness	3,088	0	2,461
<i>Likely maximum # of California small business-owned GDFs anticipated to voluntarily install updated ISD software</i>	2,487	0	1,860
Total estimated ISD overpressure alarm response costs eliminated (cost-savings), assuming all predicted required installations take place	(\$31,899,024)	\$0	(\$31,899,024)
Total estimated ISD overpressure alarm response costs eliminated (cost-savings), assuming all predicted required and voluntary installations take place	(\$108,940,196)	\$0	(\$103,703,912)
<i>Total estimated ISD overpressure alarm response costs eliminated by California small business-owned GDFs</i>	(\$69,012,606)	\$0	(\$63,711,102)
B. Address All Proposed Regulatory Amendment Goals (Includes both required and potential maximum voluntary installations of updated ISD software.)			
Difference in total costs compared to Alternative 1 (BAU)	\$14,126,093	---	\$36,396,458
Difference in total cost-savings compared to Alternative 1	(\$108,975,309)	---	(\$106,258,649)
Net cost-savings compared to Alternative 1 ^(a)	(\$94,849,216)	---	(\$69,862,191)
<i>Net cost-savings for small businesses ^(a)</i>	<i>(\$60,122,008)</i>	---	<i>(\$46,223,422)</i>

[a] Alternative 2 would reduce overall net cost-savings for all businesses active in California by about 22 percent, and net cost-savings for small businesses by about 23 percent, compared to the proposed amendments:

$$\begin{aligned} \text{All businesses:} &= (\$94,849,216 - \$69,862,191) \div \$94,849,216 = 26\% \\ \text{Small businesses:} &= (\$60,122,008 - \$46,223,422) \div \$60,122,008 = 23\% \end{aligned}$$

K. METHODS TO ESTIMATE THE NUMBER AND TYPES OF AFFECTED BUSINESSES

Required elements of the economic impact assessment presented in Chapter VIII include estimates of the total number of businesses that could be impacted (either positively or negatively) by the proposed amendments, the number or percentage of total businesses impacted that are small businesses, and initial and ongoing costs for a small business, a typical business, and an individual. For the purpose of undertaking an economic impact assessment, Government Code § 11346.3, subdivision (a)(4)(B), defines a small business as a business that is all of the following: (i) Independently owned and operated; (ii) Not dominant in its field of operation; and (iii) Has fewer than 100 employees.

Businesses that own and operate GDFs and vapor recovery equipment manufacturers are the regulated entities under the proposed amendments and could be directly impacted by new costs and cost-savings. In addition, the proposed amendments are likely to indirectly affect service contractors that respond to ISD alarms and install ISD software. Table L-69 provides a summary of the estimated number of business by each type and the next three sections briefly describe the methods used to develop these estimates. Businesses that own GDFs comprise about 95 percent of all the businesses that may be impacted by the proposed amendments, and small businesses that own GDFs are the most prevalent type of small business. Therefore, CARB staff estimated initial and ongoing costs for a small business that owns GDFs and a typical business that owns GDFs in section K.1.

Table L-69: Number and type of businesses active in California that may be directly or indirectly impacted by the proposed amendments

Potentially Impacted Business Type	Total	Percent of All Businesses	California Businesses [^]	California Small Businesses	Percent that Are Small Business
Vapor recovery equipment manufacturers	16	0.6%	2	1	6.3%
Businesses that own GDFs (required and voluntary actions)	2,721	95.2%	2,709	2,662	97.8%
Subtotal for directly impacted businesses:	2,737	---	2,711	2,663	97.3%
Service contractors	121	4.2%	110	110	90.9%
Total:	2,858	100.0%	2,821	2,773	97.0%

[^] CARB staff uses the phrase "California business" in this context to describe businesses that are headquartered in California.

CARB is not aware of any cost impacts that a representative private person would necessarily incur in reasonable compliance with the proposed amendments. Information provided by the Air Districts [CARB, 2020a] indicates no individuals, only businesses and government agencies, own GDFs directly affected by the proposed amendments. In addition, no noticeable indirect or induced costs or benefits for individuals, such as costs or savings being

passed on to consumers, are anticipated. Cost-savings are anticipated for many retail GDFs; consequently, no cost increases are expected to be passed on to GDF customers. As described earlier in Tables L-24 and L-25, cost-savings could vary substantially from one retail GDF to the next and, on statewide basis, CARB staff does not anticipate a noticeable reduction in the price of gasoline at the pump for customers.

1. Business-owned GDFs

The previously-discussed methods used to estimate costs and cost-savings for the GDF sector under the proposed amendments and alternatives are based on per-GDF costs rather than per-business costs because businesses frequently own more than one GDF. According to U.S. Census Bureau statistics, California retail gas stations have on average 9 employees [USCB, 2020a]. Therefore, a GDF business could have up to 11 GDFs and be considered a small business (i.e., $100 \div 9$ employees per GDF = 11 GDFs). However, while Air District and CEC surveys provide an estimate of the number of GDFs in California [CARB, 2020a; CEC, 2019], the surveys do not provide the number of businesses that own the GDFs. CARB staff estimated the number of businesses based on a review of UST ownership records downloaded from the California Environmental Reporting System in September 2018 [CERS, 2018; CARB, 2020o]. Tables L-69 (prior page), L-70, and L-71 provide summaries of the UST ownership review.

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Table L-70: Estimated number and type of businesses that own GDFs in California that may be directly impacted by the proposed amendments

Estimated number of affected businesses (and GDFs) by required and voluntary actions under the proposed amendments	Total	California businesses ^[a]	California small businesses
1 & 2. Replace ISD software overpressure alarm criteria with improved pressure reports and pressure data storage:			
REQUIRED to install ISD consoles with updated software: Existing GDFs that have major modifications or irreparable console damage, and new GDFs at the time of construction after updated software is available	798 (3,098)	786 (2,100)	741 (741)
VOLUNTARY & REQUIRED installations: Likely maximum number of existing GDFs and new GDFs constructed before updated ISD software is available that voluntarily install updated ISD software based on cost-effectiveness, in addition to existing GDFs that have major modifications or irreparable console damage, and new GDFs at the time of construction after updated software is available ^[b]	798 to 2,721 (3,098 to 6,186)	786 to 2,709 (2,100 to 4,933)	741 to 2,662 (741 to 3,226)
3. Allow manufacturers to install modern ISD communication ports instead of the RS-232 port:			
If ISD manufacturers decide to replace RS-232 ports with modern ports, only ISD consoles with modern ports will be available for sale in California for existing GDFs that have major modifications or irreparable console damage, and new GDFs. These estimates assume ISD consoles with modern ports become available at the same time as updated ISD software.	798 (3,098)	786 (2,100)	741 (741)

[a] CARB staff uses the phrase "California business" in this context to describe businesses that are headquartered in California.

[b] Estimates of voluntary installations are presented as a range because GDFs not required to install updated ISD software can choose whether to install the updated ISD software. GDFs that choose to not install updated ISD software would not be impacted by any new costs or cost-savings under the proposed amendments. CARB staff estimated a likely maximum number of voluntary installations based on cost-effectiveness estimates.

Table L-71: Types of businesses that own retail GDFs with USTs (with and without ISD) in California, not including small businesses

Category	Estimated Number of Businesses per Category	Estimated Number of Businesses Incorporated in California	Estimated Number of GDFs per Category	Average Number of GDFs Owned per Business	Minimum Number of GDFs Owned per Business	Maximum Number of GDFs Owned per Business
Major oil companies	4	1	952	238	9	577
Hypermarkets	5	3	242	48	11	110
Large independent chains (>20 locations)	25	21	1,829	79	21	344
Mid-sized independent chains (12-20 locations) [^]	23	20	316	14	10	19

[^] The mid-sized independent chain category also includes businesses with fewer GDFs if the businesses are headquartered outside of California.

a. Costs for a Small Business

The proposed amendments will potentially affect 2,662 California small businesses that own GDFs, of which approximately 741 businesses are required to install updated ISD software that eliminates ISD overpressure alarms at the time of new GDF construction or major modification of an existing GDF (Table L-70; CARB, 2020o). The updated software would be included with the purchase of the new ISD console that would already be part of the major modification or new construction. Assuming that vapor recovery equipment manufacturers are able to pass on their compliance costs entirely to GDFs, a GDF small business could experience an additional initial cost of about \$20 (\$23 with loan interest¹²) for updated software for a new GDF or a major modification of an existing GDF as a result of the proposed amendments (Table L-13).

CARB staff estimates that approximately 14 percent (Table L-72) or a maximum of two (i.e., 11 GDFs x 0.14) retail GDF owned by a small business could be required to install updated ISD software between 2023 and 2030 either at the time of construction (for new GDFs) or at the time of major modification (for existing GDFs). Since a small GDF business can own 11 or less GDFs and most small business owned GDFs likely will not be required to install updated ISD software, the initial costs to a small GDF business can range from zero to \$46 (i.e., \$23 per GDF x 2 GDFs).

The installation of updated ISD software, however, will eliminate overpressure alarm response costs. Based on average overpressure alarm frequencies observed statewide

¹² CARB staff assumes the additional cost for updated software will be included in the overall purchase of a new ISD console at the time of major modification or new GDF construction, and GDF owners will have a five-year loan with five percent interest for equipment and installation costs.

[CARB, 2020b and 2020n], CARB staff estimates a statewide average cost-savings of about \$3,500¹³ per year per GDF, in the absence of Advisory 405, that is required to install updated ISD software and would experience overpressure alarms without the updated ISD software. GDFs that do not experience any ISD overpressure alarms would have no cost-savings after installation of the updated ISD software. Therefore, a small GDF business that installs updated software at two GDFs may experience annual ongoing cost-savings of zero to \$7,000 (i.e., \$3,500 per GDF x 2 GDFs).

In addition, the proposed amendments could affect approximately 1,921 small businesses that may decide to voluntarily install updated ISD software in an existing GDF's ISD console based on their site-specific assessment of cost-effectiveness from eliminating ISD overpressure alarm response costs [Table L-70; CARB, 2020o]. CARB staff estimates small business owners could decide to voluntarily install updated ISD software at about 47 percent of their GDFs (Table L-72) or up to 5 GDFs (i.e., 11 GDFs x 0.47) between 2023 and 2026 based on their site-specific assessment of cost-effectiveness from eliminating ISD overpressure alarm response costs. There could be an initial cost per GDF of approximately \$3,600 for permit fees, ISD software update, installation, and loan interest (Table L-13). Therefore, the initial costs to a small GDF business that voluntarily installs ISD software can range from \$3,600 to \$18,000 (i.e., \$3,600 per GDF x 5 GDFs).

Based on average ISD overpressure alarm frequencies observed statewide [CARB, 2020b and 2020n], CARB staff estimates a statewide average cost-savings of about \$4,600¹⁴ per year per small business owned GDF that experiences enough overpressure alarms to be cost-effective to voluntarily install updated ISD software. Therefore, a small GDF business that voluntarily installs updated ISD software at 1 to 5 GDFs may experience annual ongoing cost-savings of \$4,600 to \$23,000.

¹³ CARB staff estimates that, in the absence of Advisory 405, small businesses that install updated ISD software would have cost savings of approximately \$780 to \$17,000 per GDF per year by avoiding 1 to 22 overpressure alarm responses per year. Table L-14 describes the information and assumptions used to estimate costs for one response. Table L-15 provides annual average response costs by business type and vapor recovery equipment type based on average overpressure alarm frequencies observed by statewide surveys [CARB, 2020b and 2020n]. CARB staff developed a statewide average alarm cost per small business-owned GDF required to install updated ISD software using this equation and values from Table L-15:
= (\$4680 per assist GDF x 165 assist GDFs ÷ (165 assist GDFs + 121 balance GDFs)) + (\$1794 per balance GDF x 121 balance GDFs ÷ (165 assist GDFs + 121 balance GDFs)) = \$3,500 per small-business owned GDF.

¹⁴ Table L-14 describes the information and assumptions used to estimate costs for response. Table L-15 provides annual average response costs by business type and vapor recovery equipment type based on average overpressure alarm frequencies observed by statewide surveys [CARB, 2020b and 2020n]. CARB staff developed a statewide average alarm cost per small business-owned GDF that voluntarily installs updated ISD software using this equation and values from Table L-15: = (\$5148 per assist GDF x 1727 assist GDFs ÷ (1727 assist GDFs + 712 balance GDFs)) + (\$3120 per balance GDF x 712 balance GDFs ÷ (1727 assist GDFs + 712 balance GDFs)) = \$4,600 per small-business owned GDF.

Table L-72: Estimated number of small business-owned GDFs predicted to install updated ISD software under the proposed amendments, in the absence of Advisory 405 ^[a]

Category	Existing GDFs	New GDFs (2021-2030)	Total	% of Total
Estimated number of retail GDFs with ISD owned by small businesses [retail GDF counts from Table L-4 + 2 non-retail GDFs]	4,849	443	5,292	100%
Number of GDFs potentially required to install updated ISD software at time of construction or major modification [from Table L-4]	387	354	741	14%
Likely maximum number of GDFs to voluntarily install updated ISD software to reduce overpressure alarm response costs [retail GDF counts from Table L-6 + 2 non-retail GDFs]	2,439	48	2,487	47%

b. Costs for a Typical Business

The typical business affected by the proposed amendments, not including small businesses, is a business that owns 12 or more retail GDFs. Based on a review of California Environmental Reporting System (CERS) database UST ownership records [CERS, 2018; CARB, 2020o], CARB staff estimates there are about 45 California-based businesses, and 12 businesses headquartered outside of California, that own from 12 to nearly 600 retail GDFs each. The most common types of business are mid-sized independent retail businesses that own an average of about 14 GDFs, and large independent retail businesses that own an average of about 79 GDFs. Assuming that vapor recovery equipment manufacturers are able to pass on their compliance costs entirely to GDFs, the proposed amendments could result in an additional initial cost of about \$20 (\$23 with loan interest) per GDF for new and existing GDFs required to install updated ISD software compared to the cost of ISD software under the current regulation (Table L-8).

The initial and ongoing cost to a typical California business for updated ISD software installations required under the proposed amendments depends on the number and timing of major modifications at its existing GDFs or construction of new GDFs. CARB staff estimates that approximately 73 percent (Table L-74) of retail GDFs not owned by small business (Table L-74) could be required to install updated ISD software between 2023 and 2030 either at the time of construction (for new GDFs) or at the time of major modification (for existing GDFs). This indicates that a mid-sized independent retail business required to install updated ISD software at up to 10 GDFs (i.e., 14 GDFs x 0.73) could have initial costs that range from \$23 to \$230 (i.e., \$23 per GDF x 10), depending on how many of its GDFs

have a major modification in the same year. A large independent retail business required to install updated ISD software at up to 58 GDFs (i.e., 79 GDFs x 0.73) could have initial costs that range from \$23 to \$1,300 (i.e., \$23 per GDF x 58 GDFs). These estimates assume that vapor recovery equipment manufacturers are able to pass on their compliance costs entirely to GDFs.

Based on average ISD overpressure alarm frequencies observed by a statewide survey [CARB, 2020b and 2020n], CARB staff estimates a statewide average cost-savings of about \$3,500¹⁵ per year for a mid-sized or large business-owned GDF that is required to install the updated ISD software and would experience overpressure alarms without the updated ISD software. The statewide survey indicates about 65 percent of affected mid-sized or large business-owned GDFs experience one or more ISD overpressure alarms per year [CARB, 2020b and 2020n]. A typical mid-sized business required to install updated ISD software at 10 GDFs (i.e., 14 GDFs x 0.73) could have cost-savings of about \$23,000 (i.e., \$3,500 cost per GDF x 10 GDFs x 0.65) per year, and a large business required to install updated ISD software at 58 GDFs (i.e., 79 GDFs x 0.73) could have cost-savings of about \$132,000 (i.e., \$3,500 cost per GDF x 58 GDFs x 0.65) per year.

In addition, CARB staff estimates mid-sized and large business owners could decide to voluntarily install updated ISD software at about 19 percent (Table L-74) of their GDFs between 2023 and 2026 based on their site-specific cost-effectiveness assessment of eliminating ISD overpressure alarm response costs. There could be a total cost per GDF of approximately \$3,600 for permit fees, ISD software, installation, and loan interest (Table L-8). Therefore, a mid-sized GDF business that voluntarily installs updated ISD software at up to 3 GDFs (i.e., 14 GDFs x 0.19) could experience initial costs that range from \$3,600 to \$10,800 (i.e., \$3,600 x 3 GDFs). A large GDF business that voluntarily installs updated ISD software at up to 15 GDFs (i.e., 79 GDFs x 0.19) could experience initial costs that range from \$3,100 to \$54,000 (i.e., \$3,600 x 15 GDFs).

Based on average overpressure alarm frequencies observed statewide [CARB, 2020b and 2020n], CARB staff estimates a statewide average cost-savings of about \$4,000¹⁶ per year per

¹⁵ Table L-14 describes the information and assumptions used to estimate costs for one response. Table L-15 provides annual average response costs by business type and vapor recovery equipment type based on average overpressure alarm frequencies observed by statewide surveys [CARB, 2020b and 2020n]. CARB staff developed a statewide average alarm cost per typical business-owned GDF (not small business and not a hypermarket) that is required to install updated ISD software using this equation and values from Table L-15: = (\$4680 per assist GDF x 165 assist GDFs ÷ (165 assist GDFs + 121 balance GDFs)) + (\$1794 per balance GDF x 121 balance GDFs ÷ (165 assist GDFs + 121 balance GDFs)) = \$3,500 per typical business owned GDF.

¹⁶ Table L-14 describes the information and assumptions used to estimate costs for response. Table L-15 provides annual average response costs by business type and vapor recovery equipment type based on average overpressure alarm frequencies observed by statewide surveys [CARB, 2020b and 2020n]. CARB staff developed a statewide average alarm cost per small business-owned GDF that voluntarily installs updated ISD software using this equation and values from Table L-15: = (\$4914 per assist GDF x 294 assist

GDF owned by a mid-sized or large business that experiences enough overpressure alarms to be cost-effective to voluntarily install updated ISD software. A typical mid-sized business that voluntarily installs updated ISD software at 3 GDFs (i.e., 14 GDFs x 0.19) could have cost-savings of about \$12,000 (i.e., \$4,000 cost per GDF x 3 GDFs) per year, and a large business that voluntarily installs updated ISD software at 15 GDFs (i.e., 79 GDFs x 0.19) could have cost-savings of about \$60,000 (i.e., \$4,000 cost per GDF x 15 GDFs) per year.

Table L-73: Estimated number of business-owned GDFs predicted to install updated ISD software under the proposed amendments, not including small businesses, in the absence of Advisory 405 ^[a]

Description	Existing GDFs	New GDFs (2021-2030)	Total	% of Total
Estimated number of retail GDFs with ISD owned by businesses other than small businesses [retail GDF counts from Table L-4]	2,971	272	3,243	---
Number of GDFs potentially required to install updated ISD software at time of construction or major modification [from Table L-4]	2,139	218	2,357	73%
Likely maximum number of GDFs to voluntarily install updated ISD software to reduce overpressure alarm response costs [retail GDF counts from Table L-6]	564	37	601	19%

2. Vapor recovery equipment manufacturers

Several of the proposed amendments directly affect certification procedures for manufacturers of Phase I and Phase II vapor recovery systems and components, and manufacturers of ECO nozzles and low permeation hoses. There are currently 16 manufacturers that either produce equipment already certified by CARB for sale in California,¹⁷ have submitted applications for certification, or have discussed submitting an application. These companies can be generally classified as manufacturers of industrial process furnaces and ovens (NAICS code 333994), industrial valves (NAICS code 332911), measuring, dispensing, and other pumping equipment (NAICS code 333914), motors and

GDFs ÷ (294 assist GDFs + 172 balance GDFs) + (\$2262 per balance GDF x 172 balance GDFs ÷ (294 assist GDFs + 172 balance GDFs)) = \$4,000 per typical business owned GDF.

¹⁷ Per equipment lists specified by CARB Executive Orders VR-101 through VR-105 for certification of Phase I EVR systems; Executive Order NVR-1-E for certification of non-vapor recovery hoses and ECO nozzles; Executive Order VR-501-C for Phase II EVR systems for protected ASTs with remote dispensing; Executive Order VR-201-Z for assist Phase II EVR systems; Executive Order VR-202-Z for assist Phase II EVR with ISD; Executive Order VR-203-Z for balance Phase II EVR systems; and Executive Order VR-204-Z for balance Phase II EVR with ISD.

generators (NAICS code 33512), and all other miscellaneous manufacturing (NAICS code 339999).

To identify manufacturers that might be affected by the proposed amendments, CARB staff reviewed the equipment lists specified by the following CARB certification Executive Orders:

- Executive Orders VR-101 through VR-105 for certification of Phase I EVR systems;
- Executive Order NVR-1-E for certification of non-vapor recovery hoses and ECO nozzles;
- Executive Order VR-501-C for Phase II EVR systems for protected ASTs with remote dispensing;
- Executive Order VR-201-Z for assist Phase II EVR systems;
- Executive Order VR-202-Z for assist Phase II EVR with ISD;
- Executive Order VR-203-Z for balance Phase II EVR systems; and
- Executive Order VR-204-Z for balance Phase II EVR with ISD.

CARB staff determined which manufacturers are based in California which might meet the definition of small business by reviewing information available in past certification applications and on the Internet. Two of the manufacturers are based in California, and one of these two meets the definition of a small business. Table L-70 lists the proposed amendments that would directly impact equipment manufactures and describes the distribution of manufacturers by equipment type.

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Table L-74: Number and type of equipment manufacturers that may be directly impacted by the proposed amendments

Proposed Amendment	Equipment Type	Total	California Businesses [^]	California Small Businesses
Update the ISD system software to remove overpressure alarms and improve stored information	ISD systems	2	0	0
Make the nozzle spillage standards more stringent	Phase II EVR and ECO nozzles	6	0	0
Require equipment samples for archive	Phase I and II EVR systems and components, ECO nozzles, and low permeation hoses	16	2	1
Update placeholders for CP-207 operative/effective dates	ECO nozzles	4	0	0
Clarify CP-207 performance standard and specification definitions	ECO nozzles and low permeation hoses	5	0	0
Amend CP-201 title	Phase I and II EVR	16	1	1
Incorporate nozzle dimensions by reference to SAE documents	Phase II EVR or ECO nozzles	6	0	0
Update placeholders for CP-206 effective dates	Phase I and II EVR for ASTs	4	1	1

[^] CARB staff uses the phrase “California business” in this context to describe businesses that are headquartered in California.

3. Service contractors

The proposed amendments and Alternatives 2 through 4 indirectly impact the revenue of service contractors. As noted earlier, the proposed amendments to eliminate ISD overpressure alarm criteria from ISD software would require owners and operators of existing GDFs that have major modifications or consoles with irreparable damage to install the updated ISD software, once updated software has been certified by CARB (anticipated by December 2022). Owners and operators of new GDFs would be required to install ISD systems with the updated ISD software at the time of construction. Because the updated ISD software would be installed concurrently with other equipment installation, there would be no increase in revenue for the installation service contractors. Further, GDF owners and operators that install ISD systems with updated ISD software will not have any service contractor response costs for ISD overpressure alarms, which leads to long-term reductions in service contractor revenue.

In addition, owners of existing GDFs with ISD systems could voluntarily install updated software to eliminate ineffective ISD overpressure alarm response costs, independent of any need to replace the ISD console. Such voluntary installations would result in a short-term

increase in installation service contractor revenue, but long-term reductions in service contractor revenue as ISD overpressure alarm responses are eliminated.

Only technicians with current manufacturer certifications can install, repair, and test vapor recovery equipment in California. There are about 121 companies that have technicians currently certified by one or both of the ISD manufacturers to the certification level required to install and repair ISD systems, troubleshoot ISD alarms, and upload updated software. CARB staff estimated the number of companies using lists of companies with certified technicians provided by the ISD manufacturers in June 2020. CARB staff assumes these 121 companies are the most likely to be contracted by GDF owners to troubleshoot ISD overpressure alarms and to install updated ISD software. These companies can be classified under multiple NAICS categories, most typically “commercial and institutional building construction” (NAICS code 236220) and “all other specialty trade contractors” (NAICS code 238990).¹⁸ About 91 percent (110) of the 121 companies are headquartered in California, and available information indicates all of the California businesses meet the definition of a small business. CARB staff estimated the number of companies that are small businesses based on information retrieved from the Dun & Bradstreet Business Profile database and Manta database.

CARB staff cannot estimate how many of the companies are currently contracted by GDFs to respond to ISD overpressure alarms nor predict which of the companies may be contracted by GDF owners to upgrade their ISD software, and therefore cannot predict how many might be affected by the proposed amendments. Consequently, CARB staff assumes the impact of increased revenue due to a likely increase in the installation of updated ISD software under the proposed amendments is distributed evenly across the 104 companies. Similarly, CARB staff assumes the impact of reduced revenue due to a likely reduction in ISD overpressure alarm responses under the proposed amendments is distributed evenly across the 121 companies.

¹⁸ Contractors also can be classified as: “other electronic and precision equipment repair and maintenance” (NAICS code 811219); “commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance” (NAICS code 811310); “engineering services” (NAICS code 541330), “commercial and institutional building construction” (NAICS code 236220), “environmental consulting services” (NAICS code 541620); “industrial machinery and equipment merchant wholesalers” (NAICS code 423830); and “petroleum and petroleum products merchant wholesalers (except bulk stations and terminals)” (NAICS code 424720).